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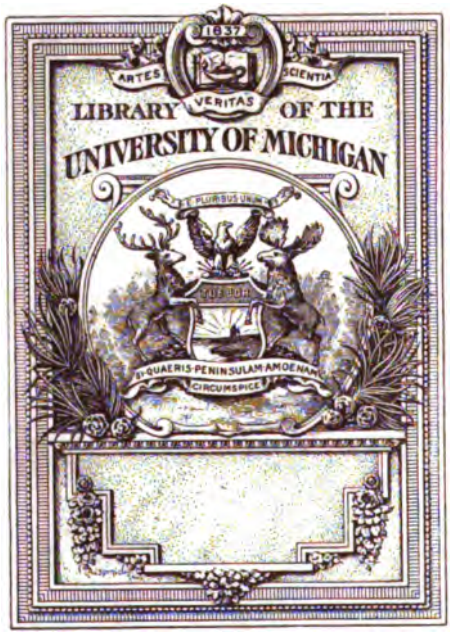

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FOURTEENTH ANNUAL REPORT

OF THE

STATE BOARD OF AGRICULTURE

OF THE

STATE OF MISSOURI,

FOR THE YEAR 1879.

S. Catalogue,

J. P. McAFEE, Secretary.

JEFFERSON CITY:
CARTER & REGAN, STATE PRINTERS AND BINDERS.
1880.

MEMBERS OF THE STATE BOARD OF AGRICULTURE.

JOHN S. PHELPS, GOVERNOR OF MISSOURI, (*ex officio*)...Jefferson City, Cole county.
R. D. SHANNON, SUPT. PUBLIC SCHOOLS, (*ex officio*).....Jefferson City, Cole county.
DR. S. S. LAWS, PRES'T MISSOURI UNIVERSITY, (*ex officio*)...Columbia, Boone county.
G. C. SWALLOW, DEAN AGRICULT'L COLLEGE, (*ex officio*)...Columbia, Boone county.
JOHN WALKER, PRESIDENT.....White's Store, Howard county.
N. J. COLMAN.....St. Louis.
E. C. MORE.....Columbia, Boone county.
M. K. LEAR.....Hannibal, Marion county.
H. ESHBAUGH.....Hanover, Jefferson county.
G. R. BUCKNER.....Naylor's Store, St. Charles county.
GEORGE HUSMANN.....Columbia, Boone county.
C. A. NEWCOMB.....Kimmswick, Jefferson county.
H. C. IRELAND.....Mooresville, Livingston county.

To the General Assembly of the State of Missouri:

In accordance with the act establishing the Missouri State Board of Agricultural, I have the honor herewith to present the report for the year 1879, also other papers of value to agriculturists.

It is to be regretted that, in so many of the counties of Missouri, no man can be found willing to furnish that information in regard to the resources and products of his county, which is so much sought after by citizens of our own State, as well as other States. The Secretary of the Board addressed letters to the members of the Thirtieth General Assembly, asking them to furnish him the names of a half dozen good men, well distributed over his county, who had sufficient enterprise, and felt enough interest in the advancement of the county, to furnish an outline of the products and material advantages of his county; but nearly forty of these Legislators failed to respond, or give a list of names, and the Secretary was left to devise other means of securing the desired information, with only partial success.

About double the number of counties that were reported in the last two Reports of the Board, are reported in this volume.

Very few of the Agricultural and Mechanical Societies in the State (more than thirty in number,) have sent in the reports required of them by law, though blanks for this purpose were sent to their Secretaries.

J. P. McAFEE,
Secretary of the Board.

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BY-LAWS.

SECTION 1. The officers of the Missouri State Board of Agriculture shall consist of a President, Vice President, Treasurer and Secretary.

SEC. 2. It shall be the duty of the President to preside at the meetings of the Board, to sign all warrants on the Treasurer ordered by the Board, and to perform such other duties as are or may be required by law. He shall be *ex officio* chairman of the executive committee. In his absence, the Vice President shall perform his duties.

SEC. 3. It shall be the duty of the Secretary to keep and preserve the minutes and records of the Board, and the proceedings of the executive committee, to furnish a copy of the same for publication, previous to the expiration of his term of service, and to countersign all warrants on the Treasurer for money.

SEC. 4. The Treasurer shall keep the funds of the Board, and pay all warrants drawn by order of the Board, signed by the President and countersigned by the Secretary, and shall make his report at the annual meeting in November, of his receipts and expenditures, from whence received and to whom paid, properly arranged for publication. He shall give bond in such penal sum as may be required by the Board for the faithful performance of his duties, and the payment of all moneys in his hands.

SEC. 5. It shall be the duty of the Secretary to conduct all correspondence with societies and individuals; to issue such circulars for obtaining statistics or other information as the Board may direct, or as may be deemed expedient or useful; to collate and arrange the correspondence, proceedings of the Board, and the proceedings of the county societies for report and publication, as required by law, and distribute to county societies and others entitled to them, all seeds, plants, publications, etc., which may be acquired by the Board for distribution. His term of office shall hereafter commence the first day of March, and continue one year, and until his successor is elected.

SEC. 6. The President, Vice President and Secretary shall constitute an executive committee, whose duty it shall be to inspect and audit all accounts, to inspect and pass upon all papers entering into the annual report, and to perform such other duties as may be required of them in the intervals between the meetings of the Board.

SEC. 7. The President shall have authority to call special meetings of the Board, whenever he may deem it necessary or important to do so.

SEC. 8. These by-laws may be altered or amended at any annual meeting of the Board: Provided, that any member proposing to amend the by-laws at said meeting of the Board, shall give two weeks' notice prior to said meeting, to all the corporate members or their successors in office, of such intended motion to amend.

SEC. 9. The records of the proceedings of the Board shall at all times be open to the inspection of the members.

LAWS CONCERNING

THE

STATE BOARD OF AGRICULTURE

AND

COUNTY AGRICULTURAL AND MECHANICAL SOCIETIES.

STATE BOARD OF AGRICULTURE.

SECTION 4042. *Board of Agricultural created.*—A Board of Agriculture is hereby instituted and created a body corporate, by the name and style of the "Missouri State Board of Agriculture," and by that name shall have perpetual succession, power to sue and be sued, complain and defend in all courts, to make and use a common seal, and to alter the same at pleasure.

SEC. 4043. *Who shall constitute Board—shall meet and elect officers, when and where—salaries.*—The persons named as corporators of the Missouri State Board of Agriculture heretofore existing, are hereby constituted the members of the Missouri State Board of Agriculture, under this article, and there shall be a meeting of said Board of Agriculture as constituted by this article, held at the Agricultural College Building of the State University, on the second Wednesday of July, 1877, to elect a President, Secretary and Treasurer, and such other officers and agents as the Board shall deem necessary. And no officer, so appointed or elected by the said Board, shall receive any salary for his services, except the Treasurer and Secretary, and the salary of the Treasurer shall not exceed forty dollars per annum, nor shall the Secretary receive more than six hundred dollars per annum; and all the offices of the present Board of Agriculture are hereby declared to be vacant from and after the time when this act takes effect. (Laws 1877, p. 5, § 2.)

SEC. 4044. *Who are ex officio members of the State Board.*—The Governor, the State Superintendent of Public Schools, the President of the State University, and the Dean of the Agricultural College, shall be *ex officio* members of the State Board of Agriculture, and the Governor shall appoint practical farmers to fill all vacancies as they occur in the corporate members of said Board of Agriculture. (Laws 1877, p. 5, § 3.)

SEC. 4045. *Officers to be elected, when—term of office.*—The officers of said Board of Agriculture shall be elected at the annual meeting of said Board, except those elected as provided for in section four thousand and forty-three, who shall serve for one year and until their successors are elected and qualified; and the offices of the Secretary and Treasurer shall be in the Agricultural College Buildings of the State University, in the town of Columbia, Boone county. (Laws 1877, p. 6, § 4)

SEC. 4046. *Board to adopt by-laws.*—The Missouri State Board of Agriculture, and their successors, shall have power to adopt such by-laws and make such rules and regulations for the government of said Board and the management of its affairs and business, as they may deem best calculated to promote the interest of agriculture, and as shall not be inconsistent with the Constitution and laws of the State of Missouri and of the United States. (G. S. 320, § 5.)

SEC. 4047. *Annual meetings—membership.*—There shall be held in the Agricultural College Building aforesaid, on the first Wednesday of November, in each year, an annual meeting of the State Board of Agriculture, together with the president of each county agricultural society, or delegate therefrom, duly authorized, who shall for the time being be *ex officio* members of the State Board of Agriculture, for deliberation and consultation as to the wants, prospects and condition of the agricultural interests of the State, to receive the reports of district and county societies, and to fill by elections all vacancies in the Board. The President shall have power to call meetings of the Board when he may deem it expedient, and at any meeting of said Board, seven members shall constitute a quorum; and all meetings of the Board shall be held at the place of holding the regular meetings of the Board, in November of each year. (Laws 1877, p. 6, § 6.)

SEC. 4048. *Agricultural and Horticultural societies to make report to Board.*—It shall be the duty of all agricultural and horticultural societies, organized and established in accordance with the laws of this State, to make a full report of their transactions to the Missouri State Board of Agriculture, at each annual meeting thereof. (G. S. 320, § 7.)

SEC. 4049. *Board shall make annual report to General Assembly—report shall contain, what.*—It shall be the duty of the said Board to make an annual report to the General Assembly of the State, embracing the proceedings of the Board for the past year, and an abstract of the reports and proceedings of the several agricultural and horticultural societies, as well as a general view of the condition of agriculture and horticulture throughout the State, accompanied by such recommendations, including especially such a system of public instruction upon those subjects as may be deemed interesting and useful. (G. S. 320, § 8.)

SEC. 4050. *Printing and distribution of annual reports of Board.*—The Public Printer shall, annually, under the direction of the President of the State Board of Agriculture, print fourteen thousand copies, of which two thousand shall be in the German language, of the annual report of the said Board of Agriculture; five hundred copies to be bound in cloth, balance in paper covers, to be distributed as follows: Twenty copies to each member of the General Assembly, fifty bound copies to the State Library, thirty copies to each county clerk for distribution among the farmers, as generally as may be, and the remainder to the State Board of Agriculture, to be distributed among the several agricultural and horticultural societies and farmer clubs of this State and other States, as the Board may direct: Provided, that said annual report shall not contain more than five hundred pages. (Laws 1875, p. 3, § 1.)

COUNTY AGRICULTURAL AND MECHANICAL SOCIETIES.

SEC. 4051. *Associations for the purpose of agriculture, etc., may be incorporated, when—powers, etc.*—Whenever fifty freeholders within this State shall present a petition to the county court of the county in which they or a majority of them reside, setting forth that they desire to organize and be incorporated for the purpose of promoting improvements in agricultural manufactures and the raising of stock, and the court shall be satisfied that such persons are freeholders of this State, the court shall, by an order, declare the petitioners incorporated for the purposes specified in this section, and thenceforth the petitioners shall be a body politic and corporate, by the name and style of the (naming it) county agricultural and mechanical society, and by that name they and their successors shall be known in law, have perpetual succession, sue and be sued, plead and be impleaded, defend and be defended, in all courts and in all actions, pleas and matters whatsoever, and shall have power to purchase, hold and receive any quantity of land not exceeding one hundred acres, with such buildings and improvements as may be placed thereon, and any other property, not exceeding in value fifty thousand dollars; and may, by vote, determine that thereafter the members of said society shall be composed of such persons as shall subscribe at least one share to the capital stock thereof, in shares not exceeding twenty-five dollars each; said shares to be personal property and transferable by agreement; but no transfer shall be binding on the society until reported to and approved by the board of directors. The amount of such capital stock shall, from time to time, be fixed by the stockholders or board of directors, provided the same shall, at no time, exceed one hundred thousand dollars, and may convey, lease, sell and dispose of the property of the society, or any part thereof, for the benefit of the society, and may have a common seal, and break and alter the same at pleasure. (Laws 1867, p. 3, § 1.)

SEC. 4052. *Directors to be elected, when—term of office—powers and duties—vacancies, how filled—who shall not be a director.*—Within thirty days from the date of the order of the county court, any number of the petitioners exceeding twenty, may proceed to organize such society by electing nine directors, who shall hold their offices one year, and until their successors are elected; and the directors, when so elected, shall collectively form a board for the government of such society; and in such board shall be vested all the corporate powers and duties of every society incorporated as provided in this article; and for the purpose of electing the directors, there shall be held, annually, a general meeting of the members of the society. All vacancies in the board of directors shall be filled by appointment of the board. No person, not a member of the society, shall be a director. (G. S. 321, § 2.)

SEC. 4053. *Directors to meet and select officers, when.*—Every board of directors shall assemble within twenty days after their election, and choose a president of their number, and some other persons as secretary, treasurer, collector, and such other officers, servants and agents as may be necessary, remove them from office and prescribe their duties; and all proceedings of the board shall be public. (G. S. 321, § 3.)

SEC. 4054. *Duty of officers.*—It shall be the duty of the president to preside at all meetings of the board and of the society, and in case of his absence, such other person as the members present shall appoint; and it shall be the duty of the secretary to keep a record of the proceedings of the directors and of the society;

and the treasurer shall give bond and security, to the acceptance of the board of directors, for the benefit of the society, in such sum as they, or a majority of them, shall determine, conditioned that he will faithfully receive and pay over, on their order, all moneys or other articles, the property of the society, that may come into his hands as treasurer, which bond shall be deposited with the secretary of the board of directors; and the said treasurer shall keep fair and accurate entries of all moneys and other articles by him received as treasurer, and from whom received, and to whom and for what purpose paid out, and make report of the financial operations of his office as often as he may be directed by the board of directors. (G. S. 322, § 4.)

SEC. 4055. *Majority of board a quorum—general powers.*—The said board, a majority of whom shall form a quorum, shall have power to make, ordain and adopt a constitution and all necessary by-laws, ordinances, rules and regulations for the government of the board of directors and of the society, and for the promotion of the objects for which it is designed; and the president of the board shall cause the same to be carried into effect: provided, such constitution, by-laws, ordinances, rules and regulations shall not be inconsistent with the Constitution and laws of this State. (G. S. 322, § 5.)

SEC. 4056. *Money to be appropriated, how.*—All moneys paid by members and others, and donations made to the society, shall be appropriated, under the direction of said board, in conformity to such constitution, by-laws, rules and regulations as may be ordained and established for the government of the society, and for the advancement and encouragement of the objects of the society. (G. S. 322, § 6.)

SEC. 4057. *County court may appropriate money to the society, when.*—The county court of any county in which there shall be a society organized according to this article, or any special act of incorporation, shall have the power and may, if it shall be deemed expedient, appropriate out of the county treasury, for the benefit of the society, the sum of one hundred and fifty dollars in any one year; and the money so appropriated shall be drawn by the treasurer of the society on a proper warrant: provided, said money shall be annually awarded by the board of directors in premiums, or expended by them in the purchase of premiums, to be known as "the (name the county) court premiums," to be awarded according to the rules, regulations and by-laws of the society: and provided further, that not more than one such premium shall be awarded to the same animal or article of exhibition by the same county society. (G. S. 322, § 7.)

SEC. 4058. *Directors to report at each annual meeting—copy of report to be transmitted to State Board of Agriculture.*—At each annual meeting of the society, the board of directors shall report, in writing, the number of members and the financial condition of their society; the quantity and character of property owned by it, and the quality and cost of improvement of the same; the number and value of premiums awarded at their annual fair; the number and character of animals and articles exhibited; a statement of the probable quantity of the staple commodities of the county, and prices current thereof, and such other information in relation to the agricultural and mechanical interests of the county, as they may deem worthy of general notice; and a copy of the report so made shall be transmitted to the Missouri State Board of Agriculture, to be disposed of as provided in the next succeeding section. (G. S. 322, § 8.)

SEC. 4059. *State Board to report to General Assembly.*—The Missouri State Board of Agriculture shall, at each session of the General Assembly of the State of Missouri, report faithfully all the facts, statistics and information contained in the reports transmitted to them from the county agricultural and mechanical societies, organized and incorporated under the provisions of this article, and such other facts, statistics and

information as they may gather from other counties in this State in regard to agricultural, mechanical and domestic manufactures and productions, and to the raising of the various breeds of stock. (G. S. 323, § 9.)

SEC. 4060. *Property shall be held, for what purpose.*—The land and other property which may be held by any society under the provisions of this article, shall be held by the society for the sole purpose, and none other whatsoever, of erecting inclosures, buildings and other improvements calculated and designed for meetings of the society, and for exhibitions of various breeds of horses, cattle, mules and other stock, and of agricultural, mechanical and domestic manufactures and productions, and for the purchase and importation, and the keeping thereof, of such foreign breeds of stock as the board of directors may deem advantageous to the interests of the county. (G. S. 323, § 10.)

SEC. 4061. *Who shall be members.*—The members of any society, organized under the provisions of this article, shall be composed of such persons, and none others, as shall have subscribed their names as such in the books in which the proceedings of the society and of the board of directors are or shall be recorded, and paid annually to the treasurer of the society such sum, not exceeding five dollars in any one year, as may be established by the rules, by-laws and regulations of the society as a membership fee; and such persons shall be members only for the year for which they shall have paid such fee. (G. S. 323, § 11.)

SEC. 4062. *Order of incorporation to be recorded.*—A duly authenticated copy of the order of the county court, provided for in section four thousand and fifty-one, shall be filed and recorded in such manner as conveyances of land are, by law, directed to be recorded in the office of the recorder of the county, within three months after such order shall be made. (G. S. 323, § 12.)

SEC. 4063. *Constitution, etc., shall be printed, etc.*—The constitution, by-laws, rules and regulations of the society and board of directors shall be printed and circulated among the members of the society within thirty days after their adoption. (G. S. 323, § 13.)

SEC. 4064. *Property shall be sold, when.*—Whenever a majority of two-thirds of the members of any society organized under the provisions of this article, shall, at an annual meeting, declare such society dissolved; or if, from any other cause, said society shall be dissolved or fail to meet and pursue the objects of the society for the period of five consecutive years, then the real estate and all other property held by it shall be sold for cash in hand, at public auction, before the court house door of the county, after thirty days notice given in some newspaper published in the county, if there be one, and, if not, by ten printed advertisements set up in ten public places in the county, describing the property to be sold, and the time, place and terms of sale. Such sale shall be conducted by the directors, or a majority of them, chosen and elected as provided by this article. (G. S. 323, § 14.)

SEC. 4065. *Parties guilty of misconduct shall be arrested, etc., when.*—At any fair, show or exhibition, held by any incorporated agricultural and mechanical society, every person who shall, without the permission of the officers of such society, enter within any inclosure which may be used by such society as an agricultural and mechanical fair, and every person guilty of disorderly conduct, or such conduct as may interrupt or be prejudicial to the interests of such fair or exhibition whatever, within the inclosure for the same, or at a distance within two hundred yards of such inclosure, shall be liable to immediate arrest by any officer of such society, and to the payment of five dollars to the society holding such fair, show or exhibition, to be recoverable at the suit of such society before any justice of the peace of the county in which such fair, show or exhibition may be held. (G. S. 323, § 15.)

SEC. 4066. *Societies may perpetuate their organization, when.*—All agricultural societies in this State, established under the act above cited, and that have failed to keep up their organizations as required by the law, approved November 28, 1855, are hereby authorized and empowered to pursue the objects of such societies and perpetuate their organizations as though no failure to observe the law had occurred. (G. S. 324, § 16.)

PROCEEDINGS

OF THE

Missouri State Board of Agriculture.

AGRICULTURAL COLLEGE BUILDING,
COLUMBIA, MO., November 5, 1879.

The State Board of Agriculture of Missouri convened according to law in the rooms of the Agricultural College building, at 10 o'clock A. M.

Before convening formally the members of the Board, together with the students of the University, and a large number of citizens, assembled in the University Chapel to listen to a very able and interesting address by J. A. Hedges of St. Louis, on the varieties of sorghum, the profits to be derived from its culture, and the process of converting the sorghum syrup into sugar, specimens of which were displayed.

The following members and delegates were present:

E. C. More, President; G. C. Swallow, S. S. Laws, Geo. Husmann, Charles Weber, representing the St. Louis Agricultural and Mechanical Association; John Burruss, representing Saline County Agricultural and Mechanical Association, and J. E. Erwin, representing the Boone County Agricultural and Mechanical Association. Dr. Laws and Prof. Swallow were necessarily compelled to be absent throughout the day, on account of which the Board adjourned until 10 o'clock to-morrow morning.

MORNING SESSION.

NOVEMBER 6, 10 O'CLOCK A. M.

Board was called to order by E. C. More, President, and proceeded to business.

Mr. More, who was appointed a committee, at the last annual meeting of the Board, to secure from the former Secretary the books, papers and other property of the Board, reported that he had attempted several times to see Mr. Monteith, but had not been able to find him, whereupon Prof. Swallow offered the following:

Resolved, That the President of this Board be authorized and instructed to take all necessary steps to obtain the possession of all property of the old Board in possession of the former Entomologist, Mr. C. V. Riley, and the former Secretary of the Board, Mr. John Monteith.

Which resolution was unanimously adopted.

On motion, Mr. J. E. Erwin was invited to read a paper on the subject of Dairying in Missouri, after reading of which the Board entered into an interesting discussion upon the various points brought out in the paper, and a copy was asked for publication in the proceedings of the Board.

On motion of Prof. Swallow, the following was adopted:

Resolved, That when this annual meeting adjourn, it adjourn subject to the call of the President.

On motion of Dr. Laws, the following resolutions were adopted:

WHEREAS, The Thirtieth General Assembly of the State of Missouri made appropriation of $1,250, yearly, for 1879 and 1880, to the Board of Agriculture and State Horticultural Society of Missouri, without dividing the said appropriation between the two bodies; and

WHEREAS, One-half of this amount for each of the organizations is understood to be equitable and satisfactory to both parties; therefore

Resolved, That the Executive Committee of the Board of Agriculture of the State of Missouri, be and is hereby directed to arrange with the State Horticultural Society for an equal division of the funds thus appropriated, and make a requisition on the Auditor of the State, if the way be clear, for six hundred and twenty-five ($625) dollars for 1879, and a like sum for 1880, leaving like sum subject to the requisition of the State Horticultural Society for said years.

Resolved, 2d, That the requisition of the Board of Agriculture be placed in the hands of the Treasurer of this Board for the purpose of his collecting the same.

The Board took a recess until 4 o'clock P. M.

AFTERNOON SESSION.

4. O'CLOCK P. M.

On motion of Dr. Laws, the question of paying mileage and per diem to the members of this body, was referred to the Executive Committee.

The Secretary read an account of the expenditures of his office for the past two years, which was referred to the Executive Committee to be audited and settled.

Mr. Burruss offered a resolution, which was adopted, requesting Mr. J. A. Hedges to furnish a copy of the paper read by him before this Board on yesterday, for publication in the Annual Report.

On motion of Dr. Laws, it was ordered that when this Board adjourn to-day, it adjourn to meet to-morrow morning, to hear an address by H. Clay Dean, to be delivered on the invitation of this Board, in the University Chapel.

On motion, Mr. More was requested to take such steps as, in his judgment, may be sufficient to secure the organization of this Board under the law as it now exists.

On motion, the Board adjourned till to-morrow morning at 9 o'clock.

MORNING SESSION.

FRIDAY, November 7, 1879.

The Board assembled in the University Chapel and listened to a very excellent and eloquent address by H. Clay Dean. Subject: "Dignity of Agricultural Life." The Board requested a copy of Mr. Dean's address for publication in the Annual Report.

On motion, the Board adjourned to meet again on Saturday, 15th November, 1879. In the meantime, Mr. More is to examine the law and report what changes, if any, were made by the last General Assembly.

MORNING SESSION.

SATURDAY, November 15, 1879.

The Board met pursuant to adjournment in the rooms of Agricultural College.

Mr. More reported that he had examined the acts of the last General Assembly relative to this Board, and that no changes had been made in the law under which the Board exists.

Mr. More also informed the Board that he had in his possession a commission from the Governor of the State, appointing John Walker of Howard county, a corporate member of this body instead of Mr. Morse, who had removed from the State.

On motion, the Secretary was instructed to correspond with the corporate members of this Board who have failed to attend the meetings of the Board for the past few years, and secure their resignations in case they cannot attend hereafter.

The Board took a recess till 3½ o'clock P. M.

AFTERNOON SESSION.

3½ O'CLOCK P. M.

Board was called to order by the President.

On motion, the Secretary was ordered to send blanks to the county agricultural societies for the purpose of collecting such facts and statistics as are required by law to be reported to this Board.

The verbal report of S. M. Tracy, as Treasurer of this Board, was submitted and approved.

The question of compensation to H. C. Dean for his excellent address before this body, was referred to the Executive Committee.

A motion was made to go into the election of officers for the ensuing year, when an order was made for the call of roll of members, when it was found that a quorum was not present, whereupon the following paper was adopted:

WHEREAS, The State Board of Agriculture met in the Agricultural College building November 5, 1879, and there was not before the body satisfactory information as to whether the Thirtieth General Assembly had altered the organic law of this Board because the revised statutes had not yet been published; and

WHEREAS, An adjourned meeting was held on November 15, 1879, with the view of having before the Board the information desired; and

WHEREAS, after the transaction of certain matters of business, the question of the election of officers being raised, on call of roll it was ascertained that a quorum was not present, therefore

Resolved, That the Board of Agriculture now adjourn the session of this annual meeting till the first Wednesday in March, 1880, at 10 o'clock A. M.

J. P. McAFEE, Secretary.

ADJOURNED SESSION.

COLUMBIA, Mo., March 3, 1880.

The adjourned session of the annual meeting of 1879, of the Missouri State Board of Agriculture, convened in the lecture room of the Agricultural College, at 10 o'clock A. M., Wednesday, March 3, 1880.

The following corporate members were present, viz: E. C. More of Boone, John Walker of Howard, H. Eshbaugh of Jefferson, K. M. Lear of Marion and R. W. Gentry of Pettis county. *Ex officio* members, G. C. Swallow, Dean Agriculture College, and S. S. Laws, President of the Missouri University.

The President, E. C. More, expressed his gratification in noting the presence of several new members of the Board, whose energy, intelligence and efficiency would doubtless be of great value to the interests of agriculture as committed to this Board.

The minutes of the last meeting were read and approved.

The attention of the Board was called to the fact that this was the proper time for the election of officers for the present year. Upon motion of G. C. Swallow, this was made the special order of business for to-morrow afternoon at 2 o'clock.

Dr. Laws informed the Board of the action of the Faculty of the University, tendering the use of the Chapel to the Board, for Thursday, in which, according to arrangements made by the Executive Committee of this Board, public addresses were expected from Prof. Meehan of Pennsylvania, and from Professors Blackwell, Fisher and Schweitzer of the Missouri University, on subjects relating to the interests of agriculture. On motion of R. W. Gentry, the Board accepted the use of the Chapel and returned a vote of thanks to the Faculty.

On motion of Dr. Laws, John Walker was requested to prepare a paper to be read before this Board at its next annual meeting, on "Experimental Feeding for Fattening Stock."

On motion of Dr. Swallow, the Secretary was instructed to invite Prof. McAnally to furnish music in the interval between the addresses to be delivered to-morrow morning in the Chapel. On motion of Prof. Swallow, the President appointed a Committee of three on Order of Business, whose duty it was made also to devise an order or programme of business for the regular annual meeting of this Board in November next, viz: G C. Swallow, John Walker and R. W. Gentry.

On motion, H. Eshbaugh and K. M. Lear were appointed a committee to examine the accounts of this Board, and report at the afternoon session. Board then took recess till two o'clock P. M.

AFTERNOON SESSION.

2 O'CLOCK P. M.

The Board convened and the Committee on Order of Business made the following report, which was adopted for this afternoon: 1. Report of Committee on Treasurer's accounts. 2. The appointment of the Committee on Legislation. 3. On Agricultural College. 4. On Secretary's Report. 5. On Sorghum and Sugar Manufacture. 6. On Horses, Cattle, Sheep, Hogs, Corn, Wheat, Oats, Rye, and Barley, Millet, Grasses, Soils and Fertilizers, Artichokes, Potatoes, Fruit Trees. 7. Experiments in Farm Crops.

They also reported the following Order of Business for the second day, viz: 1. Prof. Schweitzer's Lecture, 9 o'clock A. M. 2. Prof. Blackwell's Lecture, 10 o'clock A. M. 3. Prof. Fisher's Lecture, 11 o'clock A. M., in the University Chapel. 4. At 2 o'clock P. M., the Election of Officers in the Agricultural College Room. 5. Talks by R. W. Gentry, K. M. Lear, and John Walker. 6. At 7:30 o'clock P. M., in the Chapel, Prof. Meehan's Lecture and Address by H. Eshbaugh.

The committee appointed to examine the books and accounts of the Treasurer, submitted their report, as follows:

To the President and Members of the Board of Agriculture:

Your committee appointed to examine the accounts of S. M. Tracy, Treasurer of this Board, ask to submit as their report, that they have examined the account, and

find that he received on the 16th of January, 1880, from the Treasurer of the State of Missouri, $1,250, and that he has paid out upon vouchers exhibited, as follows:

To G. C. Swallow, Treasurer of the State Horticultural Society	$625 00
To J. P. McAfee	124 91
Balance in the hands of Treasurer	500 09
Total	$1,250 00

Respectfully submitted.

[Signed.] H. ESHBAUGH,
K. M. LEAR,
Committee.

Prof. G. C. Swallow offered the following resolution, which was adopted: "That a committee of three be appointed to investigate the condition of the Agricultural College, and make such suggestions to those managing the College as they may deem expedient, and make a full report of its condition and its wants at the next annual meeting." John Walker, H. Eshbaugh and K. M. Lear were appointed. On motion R. W. Gentry was added to the committee.

A motion was adopted, constituting the Executive Committee a committee to advise with the Secretary in reference to the annual reports of the Board.

In accordance with the order of business adopted, the Board appointed the following committees:

Committee on Legislation, with authority to ask what additional outside aid they may require—John Walker, H. Eshbaugh, R. W. Gentry, H. C. Ireland, N. J. Colman.

Committee on Sorghum and Sugar Manufacture, and the establishment of a mill in connection with the Agricultural College—J. A. Hedges, —— Belcher and N. J. Colman of St. Louis, and Prof. G. C. Swallow.

Committee on Horses—N. J. Colman.

On motion of Dr. Laws, an invitation was extended to Prof. Law of Cornell University, to be present at the annual meeting of the Board in November, and deliver one or more addresses on the subject of Veterinary Science.

Committee on Short Horn Cattle—C. E. Leonard of Cooper county.

Committee on Dairies and Dairy Stock, including Jerseys—Gen. Odon Guitar of Columbia.

Committee on Cattle of Missouri, the breeds and the marketing of the same—Geo. Longman of St. Louis.

Committee on Sheep, including the various breeds—R. W. Gentry.

On motion of G. C. Swallow, all visitors present were invited to participate in the discussions of the Board.

Committee on the Breeds of Hogs and raising of the same—N. H. Gentry.

Committee on Corn, various kinds and culture—Robt. Maddex, Superintendent College Farm.

Committee on Wheat and experiments connected with the same—Prof. S. M. Tracy.

Committee on Varieties and Culture of Oats—Charles E. Prunty of St. Louis county.

Committee on Rye and Barley—K. M. Lear.

Committee on Millet—C. H. Webber, St. Louis county.

Committee on Grasses for Grazing and Hay—James R. Estill of Howard county.

Committee on Soils and Fertilizers—Prof. G. C. Swallow.

Committee on Artichokes—J. C. Evans, Clay county.

Committee on Varieties of the Potato and Culture—A. S. Smith of Ralls county.

Committee on Varieties of Fruit Trees, and the marketing of the same, including tree peddlers—George Husmann, Mr. Reagan of Independence, and Mr. Starke of Pike county.

Committee on Experiments in Farm Products—Professors Swallow, Husmann, Tracy and Superintendent Maddex.

On motion, the Secretary was instructed to furnish a copy of the proceedings of this meeting, in full, to the agricultural papers of St. Louis, and the Columbia and other weekly papers.

The President, who was appointed a committee at a former meeting to see Mr. Monteith, the former Secretary of this Board, in regard to the books, papers, reports, desks, etc., belonging to the Board, stated that he had had an interview with Mr. Monteith, and that gentleman said to him, he had disposed of all the property formerly in his hands (save a few books), to pay his claim against this Board for his services as Secretary. The report was accepted and the committee continued.

Prof. Tracy reported that he had received a communication from Prof. C. V. Riley, and that he proposed at an early day to turn over to the Board all property in his possession upon which the Board had claim.

The Secretary read a letter from the President of the Millers' International Exposition, asking that this Board send specimens of grain grown in the various counties of Missouri to the Exposition, to be held in Cincinnati next June, and promising that all such grains should be properly labeled and credited to Missouri, whereupon S. M. Tracy and R. W. Gentry were appointed a committee to collect grains, etc., and forward to the said International Exposition.

On motion, Board took recess till 9 o'clock to-morrow morning.

MORNING SESSION.

MARCH 4th, 9 o'clock A. M.

The Board assembled in the Chapel of the State University.

President, E. C. More, in the chair.

The entire morning session was taken up in listening to very interesting addresses from Prof. Schweitzer on the Principles of Vegetable growth; Prof. Blackwell on Oriental Agriculture, and from Prof. Fisher on Roman Agriculture. In the interval of the addresses the University Choir, presided over by Prof. McAnally, furnished most delightful and refreshing music. At the close of these exercises, Mr. Eshbaugh moved that a vote of thanks of this Board be tendered to these gentlemen for the very able, interesting and instructive addresses delivered by them, and to Prof. McAnally and his Choir for their delightful music, and that copies of each of these addresses be requested for publication in the report of the Board.

The Board then took recess till 2 o'clock P. M.

AFTERNOON SESSION.

2 O'CLOCK P. M.

The Board reassembled in the Lecture room of the Agricultural College, and took up the special order of business, which was the election of officers for the present year.

Dr. Laws placed in nomination the name of John Walker. The ballot resulted in his election for the year as President. G. C. Swallow was chosen Vice President. S. M. Tracy, Treasurer, and J. P. McAfee, Secretary.

George Husmann, who had been detained from attending the present session of the Board by reason of sickness, appeared and took his seat.

John Walker was then invited to the chair by the retiring President, E. C. More, and made brief and appropriate remarks, accepting the position.

The next order was under the head of miscellaneous business.

Mr. Gentry was called for, and made some excellent remarks on the condition of agriculture in Missouri. He must not be thought to be prejudiced in favor of everything in Missouri, simply because he

was born here, and had only, on a very few occasions in his life, been without her territory. He thought that in many respects a great deal of old fogyism still existed here, and especially among that class of farmers who take no interest in education, and in informing themselves in matters of value directly to farming interests, and of scientific knowledge in its relations to agriculture. He spoke of the value of farmers being able to keep their own accounts properly, of the difficulties, losses and lawsuits resulting from a lack of such knowledge. He spoke also of the painful neglect of farmers to improve their stock, and of the feeble and unworthy objections urged by them in defense of this neglect. He mentioned the character, value and profit of growing such bullocks as were exhibited by the Hamiltons of Kentucky at the recent Chicago Fat Stock Show. He touched also upon the absurdity of farmers crying out for their rights, or of exerting the influence in the affairs of State they should, and which the value and importance of their interest demanded, without a higher order of education and intelligence. Here as elsewhere, "knowledge is power." He spoke of the vast mineral resources of Missouri, the variety and richness of soils, her rivers and forests, and her immense capabilities, being (he knew not what the present census would show) according to the last census the fifth in population, in a sisterhood of thirty-nine States. He predicted the day near at hand, when, under proper enlightenment, she would be the chief State in this grand confederation, and claimed that this Board should take the lead in pushing forward these great interests and aid in developing the resources of so grand a commonwealth.

Mr. K. M. Lear was then called and made some very appropriate remarks, expressing surprise at receiving a commission from the Governor, appointing him to membership in this Board. He spoke at some length of the great advantages which, in his judgment, must result to the people of the State from the Agricultural College, and of the fact that these advantages were not sufficiently known to the farmers of the State, else it would be more largely appreciated, but he was gratified in noting the fact that the opposition felt against agricultural training and education was, to a large extent, being removed by the enlightening influence of the grange, and he felt that this Board had a work to do in the same direction. He spoke also of the great advantages to be derived by the farmers from reading agricultural papers. These journals were now read by 100 per cent. more people than formerly. He had no doubt that the people of the State would come to the help of the Board, if its wants were sufficiently made known to them.

President Walker then made some remarks upon the duty of the members of the Board. He spoke also of the importance of establish-

ing an experimental farm to furnish facts and knowledge of feeding stock, the preparation of the feed and the most judicious method of feeding out the produce of the farm, so as to secure the largest results. He spoke also of the firm confidence the farmers of the State felt in the present management of the State University, and of the great interest manifested by the distinguished gentleman who was President both of the University and of the Agricultural College, in the farming interests of the State.

A motion was made by G. C. Swallow that the Secretary be requested to prepare a paper on the best cow for family use. The motion was amended by Mr. Eshbaugh, appointing Prof. Swallow to aid in the matter. The motion, as amended, passed.

The Board also passed a motion made by Prof. Swallow, requesting John Walker to prepare a paper on the culture and curing of tobacco, and Col. Caskie of Rocheport, Mo., to prepare a paper on the manufacture and sale of tobacco. These papers to be read at the next annual meeting of the Board in November.

On motion of Prof. Swallow, the resolution introduced by him on yesterday, in regard to compiling a book on Entomology for use of farmers, was taken up and is as follows:

Resolved, That $200 be and is hereby appropriated for the purpose of compiling a report on Entomology for practical use of the people of the State, from the reports in possession of this Board and other sources; it being understood that this sum is to pay the expenses of getting up this compilation.

Mr. Lear offered a motion, which was seconded, referring the paper to the Executive Committee, with instruction to report to-morrow morning at 9 o'clock.

On motion of Prof. Swallow, the further consideration of this matter was suspended till after the subject of the Secretary's annual report for the Board for 1879 should be considered and disposed of.

The following resolution was then adopted: That we invite the State Horticultural Society to join us in making an exhibit of the products of the two societies before the next Legislature. The following gentlemen were appointed to carry this resolution into effect, viz.: K. M. Lear, H. Eshbaugh, R. W. Gentry and S. M. Tracy.

The Secretary was then called upon for a statement as to the progress of the annual report for 1879, which was made.

Prof. Swallow then moved that the paper on compiling a book on Entomology be again taken up, which was carried.

The amendment offered by Mr. Lear was amended, on motion of Prof. Swallow, fixing the November meeting as the time at which the matter shall be reported on. The motion, as then amended, was taken

up, and the matter of compiling said Entomological report was finally deferred, because there was not a sufficient sum of money in the treasury to meet the expense.

Prof. Swallow moved that the committee on the exhibition of grain at Cincinnati, be authorized to incur what expense may be deemed necessary to accomplish the work assigned them, and that the specimens collected by them be preserved for exhibition before the Legislature.

Mr. More offered the following resolution, which was adopted:

Resolved, That the members of this Board from a distance be invited to make known to the Secretary the amount of their expenses, actually incurred, in coming to and attending this meeting, including transportation home, and that warrants be drawn upon the Treasurer for the same, in their favor.

Prof. Swallow moved that the thanks of this Board be returned to Ex-president E. C. More, for the faithful and acceptable manner in which he had discharged his duties as President for the past two years.

On motion the Board adjourned to meet again in November.

J. P. McAFEE,
Secretary.

THE KNOWLEDGE OF PLANT LIFE.

AN IMPORTANT FACTOR IN EDUCATION.

[An address by George Husmann, Professor and Superintendent of Pomology and Forestry in the Missouri Agricultural College, delivered to the Normal Institute, Columbia, Mo., on March 17, 1880.]

Mr. President, Ladies and Gentlemen of the Teachers' Institute:

It can hardly be expected of me, a self educated man, who has had to pick up what little knowledge he may have, piecemeal on the highways and byways of life, that I should be able to entertain you by any elaborate lecture. A few simple thoughts, in simple language, will be all I shall attempt to give you; yet they may present to you a phase in your calling which may be novel and worthy of your attention. Let me commence by telling you a story of my boyhood days, far across the wide Atlantic, in that dear and never-to-be-forgotten old Fatherland, where my father was a teacher of thirty-five years duration, of which fifteen years were spent in teaching a large school in Bremen, and when his health failed there, from over exertion, and his physicians advised a change to the country as the only means to save his life, he taught a school in the village of Meyenburg for twenty years. An enthusiast in his calling, he was one of that class of teachers, so seldom found, and when found not half appreciated as they deserve, to whom his pupils were a sacred trust, and to make good and useful men and women of them his highest ambition; who would have considered it a crime to taint their young minds with a single mean and sordid idea. He commenced with one of the most neglected and ignorant schools in the country, where the children had made fun of his predecessor, an old man in his dotage, half blind and nearly deaf, for over five years; where the innovations he made were considered rank heresy by an ignorant peasantry; he was met by ignorant opposition and hostile aversion which made it unsafe for him to cross the street after dark; after a lapse of twenty years, he was the familiar friend of every household; his decision in any difficulty was generally considered as final,

and when it became known that he was going to leave for America, it created such a storm of passionate entreaty to stay, that it took all his manliness and steadfast resolution to resist the pleadings of old men, with tears in their eyes; mothers who came and asked what they and their children should do without him; young men and maidens whom he had taught from childhood and who could not comprehend the idea that they would have to do without one who always was willing and ready to counsel them whenever they needed it. Had this poor village schoolmaster, who had labored for twenty years without gaining a dollar in worldly wealth, merely made a living for himself and family, not as much reason to be proud of his twenty years teaching in that village, which he had transformed from one of the most ignorant, to one of the most intelligent communities in that neighborhood, than your great generals of history have over their hard won, gory fields of battle, or the grandest orator for his momentary triumph, when he sways an audience at will, and they acknowledge a genius higher than their own? Can you wonder that the picture of a whole community, each with some kind token of farewell, assembled around our wagon at starting, eager for the last shake of the old familiar hand, the last look at that beloved face, should become indelibly stamped upon even my childish memory, and fill me with veneration for every teacher, worthy of his calling? From my father's relations of his troubles and struggles, but his final triumph and successes, I have learned to appreciate the claims of the teaching fraternity, and to value the good and conscientious teacher as the most mighty factor for good in every direction and in every community. The teacher can exert more influence for good or evil among his surroundings, where every boy is the father of the future man, than any other. He must possess a key to the nature of every one of his pupils, which will enable him to interest him and enlist his sympathy and attention; and because the child can be interested better and easier through the evidence of his senses, we want less machine and method, and more object teaching in our common schools.

This may be a bold assertion, presumptuous in one who has himself taught but little in the class room. But no one can do more than state his honest convictions and support them with such reasons and experience as he may have gathered. One of my father's most successful agents in enlisting the sympathies and attention of his pupils was his ardent love of nature and horticultural and agricultural pursuits. With all the village schools in Germany, at that time at least, there were certain endowments of a garden, dwelling and a few acres for field culture, as well as some meadows and pastures, and these, or rather their produce, form a considerable part of the income, which is often but from $100.00 to $200.00 per year in cash. It was a source of never

failing delight to him, after school hours, to cultivate his garden, prune his trees, and look after the field crops. Every day, rain or shine, after dinner, summer or winter, he took a walk until half past one, when school commenced again; all of the family had to join in that walk, if it was cold we skated and ran to keep warm, and he was the most active one and the leader in all these sports. In good weather, especially in early spring and summer, he called our attention to every flower on the way side, to the budding green of the young trees, to the wonderful transformations of nature before our eyes every day, and we were shown the glories of God's earth in their ever varying forms, and their eternal fitness and beauty, as the best illustration of the wisdom and goodness of God. Any one of the school children could join us in these rambles, and any object of interest was gathered up, taken to the school room, and shown and explained there. The village children also often volunteered their help, after school hours, and during vacation time, to assist in the garden, the field and the meadows, and if any one found something which was not clear to him, their teacher was applied to, and never failed to respond. There was no machine work about that school, though the course was strictly adhered to, yet living examples never failed to be explained and commented upon, and the children were taught to comprehend the simple and yet so mysterious workings of nature by the most apparent method, one which applied to their senses and understanding direct. These early lessons instilled into my mind a love of nature, an appreciation of its beauties, and a habit to "look from nature up to nature's God," which has been my companion through life; and to-day, when my hair is sprinkled with gray, I can enjoy a ramble in the woods on a fine spring or autumn day with a delight which I would not exchange for the gayest assembly or rout. I can feel the glories of God's creation with as keen a zest as if I were a boy again, and in this respect at least I hope to "keep my memory green" to my dying day. The worldly may laugh, and call this silly and childish, but I would not exchange with them this feeling of eternal youth, for the gayest round of what they call pleasure. But you will ask, what has all this to do with the subject of the lecture, and its practical illustration? I answer, let us see whether the method so successful with the teacher in a village school in Germany cannot be applied here, and worked out to greater perfection and utility. There is generally an acre of ground or more with every country school house, which now, in most instances, presents a rather forlorn and neglected aspect. Cannot these be transformed into spots of utility and beauty, by planting shade trees, shrubs, evergreens, and even some fruit trees and small fruits? We all know how eminently successful the so-called "Kindergaerten," according to Froebele's

method, have been, wherever introduced. How rapidly even the smallest children learn under this system of object teaching, because it interests their slumbering faculties, and develops them. Why can we not have Kindergaerten, in the true sense of the word, all over the country, in every village? Arouse a taste for the beautiful and tasteful among the community—you will find a few men of the right kind in every neighborhood, who will aid you in your efforts to have the school house lot neatly fenced, planted with a few choice trees and shrubs, a few climbing roses, clematis or honeysuckles, wistaria or any of our beautiful creepers, over the school house door and windows. Speak to the children how nice it will be to have these nodding in at the windows, spreading coolness and fragrance around them; get their young minds interested in the budding shoot, the tiny buds and blossoms as they appear and develop. Make them familiar with their names, their nature and their care; add something every year, and set aside one-half day or a whole one in each week when they are to help you in planting the garden and taking care of them. Call this the field day, and assign each little one his task, where they can help to plant vegetables, fruits and flowers. Give each his own little plant or patch which he may nurse, and the little girls their tiny flower plants or seeds, which they can see develop from the insignificant germ or seed into the brilliant and glorious flower, talk to them of their properties, their habits, their uses, why the violet loves the shade, while the dazzling geranium and sweet scented heliotrope glory in the full sunlight, and I venture to say they will soon learn to look upon their field day as a holiday, and watch their nurslings with jealous care.

One of the noblest traits hidden in every infant mind is the desire to create, to do something upon which the urchin even may look with pride and pleasure as the work of his hands, of which he is lord and master. Give this desire the noblest direction it can have, to create something good and beautiful to look upon, instead of mud pies and dirt walls, and you will have done more for the young mind than by hours of abstruse, dry recitations in history and geography, before they can fairly understand them. I am aware that there are serious obstacles in the way of such instructions. One of the most serious is the short duration of our schools, as many are held only during the winter months, and cease in early spring, so as to allow little time for outdoor lessons. I hope, however, that the parents themselves will become more convinced of the necessity of longer instruction for their children, that we will hear but little of six months schools in a few years, and that nine months will be substituted therefor. But even in a six months' term something may be done to interest your pupils in plant life. Another serious drawback is the prevailing ignorance in horticul-

tural knowledge among the farming community, and even among the teachers themselves. At the teachers' seminaries in Germany, they are instructed in horticulture and botany to a certain extent, and if we could make the same obligatory in our Normal schools, I think it would be a move in the right direction, as necessary perhaps as any other branch of knowledge. And with a taste for the subject, and some little knowledge, which nearly all of our nursery catalogues impart, you will learn rapidly yourself while instructing those who know still less. You will find a few men in every community who will help you in your good work, and if you cannot do it in a year or two years, make a beginning and let the work grow. It will do so—grow faster than you suppose, and you will grow with it in knowledge and taste. There is no calling which has purer delights; and you will find it a wholesome recreation of your often weary and tedious work. We sadly want more horticultural knowledge diffused throughout the State—we want more homes in the true sense of the word. The bare walls of a shelter overhead are not enough, even if decorated with all so-called luxury and splendor. A house nestling in trees, objects of beauty and utility all around it, is more attractive and homelike than the mostly costly edifice without the proper surroundings. It is a lamentable fact that our farmers' sons cannot remain contented on their fathers' farms; that they become tired of the monotony and drudgery of the kind of farm life which now prevails, and that they seek the cities to enter upon commercial pursuits, or the so-called learned professions, until all of these are crowded to overflowing. And yet is it not also a fact, that the successful merchants and traders number but as one to ten to the unsuccessful ones; that the second and third rate lawyers and physicians are so numerous now that there are enough of them to ruin the physical constitutions and disturb the peace of two-thirds of the communities in the country, who go around like roaring lions, eager for their prey, and seeking whom they may devour? And all of this where there is ample room for millions of smiling homesteads, where those, who are now seeking a meagre practice, could lead happy and contented lives, if the bright and ennobling side of rural life had been shown to them, the nobility and freedom of the most independent calling on earth? Why is it that we have so few farmers worthy of the name in our State, of those who work intelligently and therefore profitably, and make their farm what it should be, a home surrounded with every comfort, a pleasant place indeed for their sons and daughters to stay, and to which, when they do leave it, they can always return with anticipations of the purest pleasures and the most kindly greeting?

You can help much, very much, to create a desire for the beautiful and the truly comfortable in rural life. And here let me refer to an

element in our public schools, from whose refining influence and natural taste for all that is truly beautiful I hope very much. It is our lady teachers to whom I would refer. I have never seen a woman, worthy of the name, who is not fond of flowers, of beautiful trees, of luscious fruits, and all the rural attractions which constitute a home in the true sense of the word, while I think they are also, by their love and sympathy for children, eminently adapted to impart knowledge to the young minds. They have more patience with their short comings, while there is also generally something chivalrous and courteous in the nature of even the roughest boy, which makes him listen with more respect and deference to the instructions of his lady teacher, than he would perhaps show to a gentleman in the same position, and which will make him a willing performer of that work which may be too hard for you, and in which you may need stronger hands to do the work while you direct it. Arouse the interest of the "big boys" of your school in this work, show them how much handsomer and more useful it will make the school lot and their own homes; they will become cheerful and willing helps, imitate what they see there at home, and grow up into better and more contented men, than if left to their marbles and their quarrels among each other.

But let me ask you all, ladies and gentlemen, to give to the instruction of knowledge in plant life, in all of natures manifold phases, more attention than it has received so far. Let yours be the glorious mission to develop the taste for the truly beautiful, to help give homes to the children to which you give the education which they ought to have, to make them good and contented inmates of them. Future generations will rise and call you blessed, and keep your memory green in the community which you have helped to elevate and ennoble. We have made a beginning here at the Agricultural College. We are trying to impart the knowledge and skill, and the taste for rural pursuits. We have connected with the institution experimental grounds, nursery and greenhouse, where we test and from which we disseminate all plants and trees deserving general culture, to supply any one in the State with what he may need, of best quality and true to name. We are always ready and willing to impart such knowledge as we may have gained, in our catalogues and other publications, and to assist you in your efforts whenever we can. Our students have the opportunities afforded them to acquire the knowledge and taste to become teachers in horticulture and apostles in rural life in their immediate vicinities. Will you not also assist us to prepare the young minds for such a course of study, impart some knowledge of it to all, and thus make a better, more prosperous and happy commonwealth of this old fogy State of ours, blessed by nature above most others of her sister

States, and yet far in the rear for the want of that very knowledge which makes a people prosperous, happy and wise? Look around you, see the wide field open before you, and remember that the foundation of all knowledge must come from our country and village schools, that yours is the high office of teaching, moulding and forming the young minds who are to be our future citizens, and that the future happiness and prosperity of all of them is given into your hands to a large extent; that you can make impressions on their pliable natures which will remain with them to their dying day. The memories of our school days, of our happy and unhappy childhood, are never erased entirely from our minds, the songs of our childish days, the simple hymns with which we became familiar in school or at our mother's knee, come back to us like some sweet strain, never to be forgotten, and have saved many a soul already, just trembling on the verge of ruin. Should it not be the aim of every teacher then, to impart such knowledge to his pupils as will tend to lead their young minds into paths of virtue and happiness? And what knowledge can be more healthful and pure than an intimacy with God's handiwork? His wisdom and goodness as revealed in the humble lichens and mosses at our feet, as well as in the towering oak or majestic pine, in the beautiful blossoms of spring as in the golden and purple fruits of autumn. May you be ever mindful of this sacred charge, of the solemn trust reposed in you; and if I have imparted to you one idea in these thoughts of an humble votary of nature, but one who has always been in sympathy with, and full of high regard for the teachers of our public schools, which can aid you in your work and speed you in your efforts, I am more than rewarded for this feeble effort to assist you.

DAIRYING IN MISSOURI.

BY J. L. ERWIN.

Mr. President and Gentlemen of the Board:

Six years ago last February I had the pleasure of meeting a portion of the then State Board of Agriculture, in a called session held in Fulton. Capt. Linney read an essay on Dairying. To such as he and the agricultural press I am indebted in a large degree for my success. I have gathered here a little and there a little, until by putting the whole together I have gained much experience and many conveniences.

No man is qualified for the business unless he likes it. In the discussion of this question I shall confine myself more particularly to my own practice, to-wit: The production of milk, the manufacture of butter and the growth of the calves.

In order to have milk we must have cows. What breed? I answer most emphatically the common stock of the country graded by pure bred Short Horns.

This is a beef producing State and not a dairy State, in the sense of the production of butter and cheese for market abroad.

We lack a cool, moist climate for the growth of grass and roots. Our average temperature is too high to successfully cure cheese without expensive buildings. We have no refrigerating transportation facilities for the transportation of butter, nor are we likely, in the many years to come, to develop a business large enough in competition with the more favored North and West to induce railway managers to give us the necessary facilities. Hence, the most we may hope is to supply our local market. This of itself is no mean sum. Estimating from the amount used in the various families of my acquaintance in town and country, I would say fifty pounds to each individual per annum. The population of Missouri is about 2,000,000—equal to 100,000,000 pounds, at an average of twenty cents a pound, equals $2,000.000—quite a good income. The Holstein or Dutch cattle are next to the Short Horns—a beefy animal, but rough. At the late State Fair at Springfield, Illinois, there was quite a large display of dairy stock. A splendid looking Holstein cow belonging to Dexter Severly took 1st premium in her class. I asked the owner how much milk she gave per day. He replied, "We have got as high as fifty pounds per day." I have a grade Short Horn in my herd that in September, 1878, gave fifty-six and a half, fifty-six and fifty-six pounds per day for the three successive days, as I weighed her milk, and when well fatted, would bring considerably more per pound than the Holstein on account of her smoothness.

The wonder to me is that when there seems to be such a demand for a special breed for the dairy that some one does not make a specialty in developing a milking strain of Short Horns. If we admit that what are styled the dairy breeds are superior in their milking qualities, I doubt the gain in the end. As the most the average dairyman can do is to keep a pure bred male of whatever breed his fancy may dictate, ordinarily one-half the calves are males, no better than scrubs for beef.

The average yield of milk among the New York dairies is about 4,000 pounds. My average yield last year was about 4,200 pounds.

I usually stable my cows from the first of October to the first of May. This year I did not begin till October 22d. I feed dry meal in the beginning and closing of the grass season, leaving them to do without when the grass is abundant and nutritious. In winter I feed cut oats, hay and straw, mixed with meal and bran, wet and steamed. I turn out about 10 A. M. to water and to feed or corn fodder or hay outside. As soon as they leave the feed and come to the stable, I tie up. I regard the cow's actions as indicative of her wants in the way of feed and comfort.

Feed before milking. Begin milking at 4 A. M. and 4 P. M., all seasons of the year. I use the chain for tying in preference to the stanchion. It gives more ease and comfort to the cow, and is less as a partition or barrier to the free circulation of air.

I stable on a floor with manure cellar beneath. Find I have a purer atmosphere by having the cellar than I have found in any dairy I have visited without the cellar. Where there is a cellar there is room for the free circulation of air between the manure and the floor, thus keeping the floor dry. When there is no cellar the urine and finer portions of manure go through the floor and accumulate and decompose, creating a disagreeable odor. Another advantage is a clean, dry barnyard. Another is the increased value of the manure. With two years experience I must score every point in favor of the manure cellar.

During the time of stabling the cows, the udders are carefully washed and dried before milking. The milk strained into eight gallon cans, and removed when through milking to the milk room and poured into two gallon pans about six inches deep, and set on a revolving slat frame to let the cream rise. I have never used other than the dry setting process. The endeavor is to maintain a uniform temperature, so as to raise the cream before the milk sours, usually twenty-four to thirty-six hours. Owing probably to the larger per cent. of water, milk seems to sour quicker in summer than in winter. I am using Wilkinson's patent sub-earth system of ventilation, and find it thus far a good thing. After the cream is skimmed, it is allowed to stand twelve to twenty-four hours. Before churning endeavor to have the room in which it stands at the proper temperature—for churning sixty-two or sixty-three. I am using the rectangular churn. I used the Blanchard two years; like it, but it (the Blanchard) wears out too soon. As soon as the butter comes about the size of a grain of wheat, the buttermilk is drawn off and cold brine poured into the churn to wash the butter. A few turns of the churn made, and the brine drawn off, and fresh put on and allowed to stand two to four hours, when it is placed on the butter worker, salted more if needed, worked and packed into jars of various

sizes, according to the demand of the customer. I engage by the year, and furnish two sets of jars, one to be returned each time a full one is taken. I have been getting twenty-five cents per pound by the year—never have packed any butter—always arranged to have my cows come in so as to keep a regular supply. The quantity of milk to the pound of butter varies from twenty and a half in winter to thirty-five pounds in summer. I have been milking from fifteen to twenty-five cows more in winter than in summer, owing to the increased sale of milk in winter. I keep forty to fifty cows. The milk trade varies greatly—from thirty to thirty-five gallons per day up to fifty to seventy-five gallons a day, of new and sour milk together, during the year. I use a dipper for handling the milk. I don't like the faucet—cannot clean it, besides last customers get the best milk, and all customers get less on account of foaming with a faucet; have never saved strippings; raise all my calves, and feed them new milk till they are two and three weeks old, then I mix milk skimmed at twelve hours, and gradually all skimmed, when six weeks old; I feed skimmed at twenty-four hours standing. I add boiled oats at this age; in winter, feed cut oats and meal mixed and steamed. I sold $550.00 worth of calves during the past year. Thirty-one head of spring calves sold at auction on September 1st, at $11.50 per head; ten of the choice brought $17.40 per head.

Before closing, I desire to say a word in favor of the steam engine. I use a little five horse portable engine. It is in a lean-to shed in the basement of the dwelling; a water tank is in the garret; a wire rope runs from the gable of the barn and serves as belt to give motion to the machinery for cutting and mixing feed, hoisting hay and grain, threshing, shelling, grinding, and at the house it churns, turns the grindstone and the wood saw. It heats water to wash and scald the milk vessels, to wash and boil the clothes of the family washing, heats the dish water in the kitchen, cooks oats for the calves, cooks such dishes as are easily burned, as rice or hominy, fills the tank with water for convenient, kitchen or milk room use, or for use at the barn, in mixing feed, cooks the feed for cows in winter, heats the milk room, dining room and sitting room—using at this season about twenty-five cents worth of fuel per day. It is as easily managed by the women folks as a sewing machine, and shortens their labors many fold more.

SYNOPSIS OF AN ADDRESS

BY PROF. J. S. BLACKWELL OF MO. UNIVERSITY.

Delivered before the State Board of Agriculture, March 4, 1880.

The speaker declined to consider the subject of Oriental agriculture in the broad and modern sense of the word "Oriental," but limited his remarks to the agriculture of the Israelites, detailed in the Bible, and in the supplementary literature of the Jewish race, given in the Talmud and Midrash, from which many interesting and novel quotations were made. The speaker disowned and rejected the philosophy of Lubbock, Tylor, and their imitators, in regard to the origin of agriculture in the development of civilization, but believed in the Bible story of a contest of a higher and a lower civilization in the representative persons of the agriculturist Cain and the shepherd Abel, in which contest the higher civilization prevailed.

The easiest attempts at agriculture were confined to finding the elements of domestic sustenance; hence, gardening was prior in time to the wide cultivation of the field which supposes a settled order of government, some extent of population, the establishment of emporiums of trade, means of transportation, and common principles of barter or sale. Vegetable gardens or "gardens of herbs" are mentioned in the Pentateuch. The Israelite *Gan*, or garden, however, usually approached in meaning the Persian word *Paradise*, i. e., an inclosed space planted with choice shrubs and trees. The garden was outside of the city walls as a general custom. Exceptions were noted, as especially that of the rose-garden, mentioned in the Mishua. The speaker referred to the situation, manner of irrigation, uses and nature of the garden, at length; of the fish-ponds, game preserves, poultry yards of the private gardens; of arboriculture and apiculture in connection with garden work, interspersing the details with many discussions of interesting points in archæology. The vineyard next occupied considerable attention.

But the cultivation of the field was the most honorable employment. Boaz, the rich Bethlehemite, winnowed barley by night on his own threshing-floor. Elisha was plowing with twelve yoke of oxen, when Elijah called him to the prophetic succession. The horse was not used for plowing, but bulls, cows and asses. Oxen were unknown until the later prophets. The first instrument of agriculture was a pointed stick; the plough being originally but a forked branch of a tree, to the long end of which the draught animal was attached, and the shorter end served as a plough, after being sharpened and hardened in the fire. The kinds of crops were then given. Oats are not mentioned in the Old Testament, and rye but twice, in both of which places the Hebrew work *Kussemeth*, which means *spelt*, was wrongly translated. The speaker gave a lengthy account of the harvest and the threshing, and in conclusion remarked upon the small extent of the ancient territory of Palestine, and metamorphosis in modern times of the Jewish character in its aversion to agriculture, whereas after the return from the captivity so strong was the national reluctance to dwelling in cities, that the people were drafted by decimation to fill up the waste places of Jerusalem the Holy.

AN ADDRESS

BY HENRY CLAY DEAN, IN THE CHAPEL OF THE UNIVERSITY OF MISSOURI, AT COLUMBIA,

Before the State Board of Agriculture, November 7, 1879.

SUBJECT: "*The Dignity of Agricultural Life.*"

GENTLEMEN—There is no more beautiful type of the growth of civilization than the figure employed by the great Apostle of the Gentiles to illustrate the gradual development of manhood and revelation together. "When I was a child I spake as a child, I understood as a child, I thought as a child, but when I became a man, I put away childish things."

The slow growth of knowledge and its slower diffusion among men which crystalized civilization, and the still slower growth of science which throws the light of law upon the secret chambers of nature, and the even slower application of science to art, would dis-

courage the student, but for the consideration that the world is yet in its childhood, destined to a steady, healthful growth which shall continue until it reaches the fullest stature of manhood.

Agriculture is the oldest occupation of civilized man, and has greatly assisted in his civilization. Yet the oldest population of the earth continues to cultivate the soil without even an inquiry into the nature or the laws which govern production, and still continue to consult the stars and idols made with their own hands to propitiate the seasons, without a knowledge of the laws of climate; destroy forests and invite famines; substitute their own children for beasts of burden, and force their living from the soil by the most exhaustive toil.

The intervening chasm between the rude modes of agriculture by the ancients and the application of skilled labor, has been bridged over by the genius of modern times. The labor has been arduous, but the triumph complete. Agriculture has heretofore been treated as the fit employment of slaves, and unworthy of the dignity of freemen, as mere machine or brutal labor, when this is the truth, that in hiring mere manual labor the employer can well afford to pay at least fifty per cent. extra for the judgment and skill of the laborer, even in the ordinary work on the farm. By a slow and gradual process the farmer has advanced his interests and his enjoyments with his increasing intelligence. His home is furnished with books, musical instruments and sources of entertainment for his family. Agricultural periodicals have been established in every part of the country.

Just as astronomy was a science when the shepherds were looking with wild wonder at the grandeur of the heavens, as much as when it was taught in the schools, or that geometry was a science before Euclid wrote his Elements. So is the culture of the earth and the development of its great wealth a science, governed by laws—as inexorable law as any other of nature.

The dedication of a university to teach agriculture as a science, marks a new era in the history of the world. This is a manifesto that it is to be placed where it belongs—among the learned professions. It is eminently proper that this grand advance in civilization should take place in the United States.

Liberty and republican government in the United States are the children of agricultural society. We are indebted to it for the stability and prosperity of the Government. Riots, frauds, repeating at the polls, and false returns, are scarcely known among the rural population. Briberies and the purchase of votes are never attempted among the farming communities. Combinations, rings and conspiracies, so utterly destructive of free governments, are simply impossible among the til-

lers of the soil. And if a time shall ever come, which heaven forbid, when our republican system shall be overthrown, the farmers of the country will be the last to surrender in the terrible struggle.

When Washington led the armies of the revolution he relied for success upon the farmers who were fighting for their homes. When the plains of New Jersey had been plowed by bombshells and cannon balls from the banks of the Delaware to the beach of the ocean; when Gen. Charles Lee, the soldier of fortune, had dishonored his adventurous life by his defection at Monmouth; after Arnold's treason and vain attempt to deliver the post at West Point to the British army, and terminate the revolution at one stroke; after Philadelphia and New York had been evacuated by the patriot armies, and the starving soldiers, half naked, came hobbling up from Valley Forge in Pennsylvania, Washington, sorely pressed, was asked what he would next do to save his decimated army, to which he replied: "When every seaport is occupied by the enemy and we are driven from the seashore, then I will gather up my remaining forces and retire to the Augusta mountains in Virginia, and summon the farmers of the colonies to our aid. We will cultivate the valleys to feed our families and maintain our armies to fight the enemy until nature has increased our strength, and trust to the God of battle to give us victory and liberty."

The late Governor William Allen, of Ohio, once told the speaker that when General Jackson was re-elected President of the United States, that it was the pride of Ohio that the great body of her voters were the owners of their own homes.

The founders of our republican system rested their hopes of its final success upon its agricultural foundation.

Washington, the great leader of its armies, was bred a farmer, and at the time of his death was the largest farmer in the United States. Jefferson, the great apostle of liberty, was a farmer. David Rittenhouse, the first American astronomer, who made himself illustrious on both sides of the ocean and gave fame to his country, was a farmer and mechanic.

Of the signers of the Declaration of Independence, Carter Braxton, Benjamin Harrison (father of the President), and Francis Lightfoot Lee of Virginia, Charles Carroll of Carrollton, Maryland; Abraham Clark and John Hart of New Jersey; Batton Grinnell of Georgia, and Stephen Hopkins of Rhode Island, were farmers by profession. The three great statesmen, Webster, Clay and Calhoun, and Andrew Jackson, the iron-willed President, were farmers.

The names are countless of the eminent men who have gone from the farm to the highest positions of the government, to the learned professions and to fame.

European monarchs and tyrants in all ages well understood the danger to despotism of intelligent, free, farming communities. The feudal system was framed in view of the subjugation and slavery of the tillers of the soil, and the idleness of the feudal lords that demanded their service. The serfs of Russia, who were transferred with the soil, were harmless and submissive to the exactions of their masters, but intelligence and liberty have made Nihilists, who will first undermine and then overthrow the Russian despotism.

It is the fact, that the entire landed property of Ireland is owned by a mere handful of non-residents, that keeps the country the slave of Great Britain. It is the ownership of their homes by the people that makes France a republican government. Although she has been baptized in bloody revolutions, to secure liberty, she has taught tyranny and oppression a lesson that will ever be remembered by mankind. It is the ownership of the entire land in California, by a few men, and worked by Chinese slaves, which has threatened a social and civil war, and introduced the shot-gun and revolver into politics. So it is now, and so it will ever be.

An agricultural population, to be free, must be intelligent, not only upon the subject of agriculture, but upon all questions touching their rights as citizens. His rights are imperiled by the audacious, unscrupulous and ignorant demagogue, who presumes upon the greater ignorance of the farming classes.

It is preposterous to think of elevating the standard of agricultural life to a high rank, without an education, advancing with its improvements. Who dreams of excellence in the law, without knowledge of its history and philosophy? It is true, there are practitioners who are mere clerks, who never venture an opinion or entertain a conviction, who are mere case lawyers, whose lives have been spent in idleness, relying for success upon the happy accident of finding some case in the books, in which some court has prepared his case for him. Then, there are others, as cockle-burs and Spanish needles clinging to the cloth of the profession, who eschew learning as a worthless encumbrance. As you descend in the profession, until you come to the shyster, you will find him entering the courts to insult witnesses and ruin suitors. These gentlemen of the law hire pimps to procure clients. You will find them lying around the police courts, hunting up their victims, until the unfortunate criminal becomes more terrified at their presence, as he is in greater danger from the lawyers than he is from the officers of the law who hold him under arrest. But these lawyers leave no testimonials of their worth, add nothing to the learning or the character of the profession, or to the wealth of the world or the happiness of society.

Physicians sometimes undertake to cure the maladies of the world without pretending to the least knowledge of anatomy, physiology, or *materia medica.* This gentleman deals in innocent herbs, or bathes his patients in hot, cold or tepid water, just as the constitution of the victim may be able to endure his medicine, and have faith in his remedies. Indeed, he ventures to cure by faith alone, and invokes the aid of the Deity to ratify his imposture; and availing himself of the ignorance and credulity of the general public, does not hesitate to publish his profession in the captivating and inspiring language of the impostor as a "Faith Doctor." This gentleman has an advantage over his less fortunate professional friends. His patients go quietly to their rest, make no complaints and appeal from no decision, and their administrators settle the doctor's bill according to law.

"Office-seeking," lately admitted into the list of the learned professions, is the only one which can be vigorously and, I may add, successfully, prosecuted without regard to attainments. He is always a gentleman of pretensions. When in Congress, one of these gentlemen complains that the reporter had "mucilated" his remarks. Another, in the same Congress, arose with burning indignation and defying attitude, crying out at the top of his voice: "I deny the *alligation* and defy the *alligator.*" Still another threatens to "hoss whoop" a reporter, because the report of his speech made him talk like a ——— fool, and was only soothed, when assured that a *verbatim et literatum* report of his speech had been given.

The professional office hunter appears to better advantage when in pursuit than in possession of office. At the cross-roads, or country school house, he will pedantically refer to Cæsar's celebrated speech at the Diet of Worms; will tell you, how Hannibal discovered America; that Columbus was a Danish king of the early Brittons; speak to him of Rienzi, he will assure you that he knew him well, that he was a Dutchman who tended saw mill out on Grand River, and that his mill hands were all on hand at the caucus to vote for "me, and if you please, when you see him, tell him that I want him and the boys to be on hand, for I am a candidate for the next election."

The success of such a profession as "office hunting," feeds upon the ignorance and stupidity of the agriculturists, who, in due season, are robbed by them, first of their property, and their liberty soon follows their property.

No class of men can so poorly afford to be ignorant as the farmer. He must study agricultural chemistry, to learn the power and constituent elements of the soil, that he may understand its fertilizers. He must understand horticultural botany, that he may properly choose, plant, and carefully cultivate the grains, grasses, ornament, fruit and

lumber trees, inseparable from the farm. He must understand mechanics, to be able to adjust the machinery which makes up a large part of the farmer's tools, and which will increase with the wealth and prosperity of the country, and the architecture employed in his buildings. As has been intimated, the farmer is the conservative power in a republican government, and should be well read in the history of his own, contemporary, modern and ancient governments, that he may intelligently participate in the election of its public officers.

Agriculture is the highest of all professions. It is the application of knowledge to the sustenance of human life.

The increasing populations of the earth can be maintained only by the education of the farming communities, and the general diffusion of knowledge among the tillers of the soil.

While this University stands as the monument of the generosity of private gentlemen, the chief of whom is no more among the living, but lives nevertheless in every lesson taught in the classes, whose memory is borne away in the heart of every graduate, and revered by the people of the State, notwithstanding it is the duty of the people to educate their children in their own institution. Yet, mere college education furnishes but the implements of a broad, deep education which is the untiring work of a life time. Sir Isaac Newton, who gave a new birth to mathematics, when he felt life sinking, and the golden bowl breaking, and the silver cord loosing, the wheel breaking at the cistern, and the pitcher breaking at the fountain, with a sigh, said that he felt in his search for knowledge like a child playing upon the sea shore, who had been only able to pick up a single pebble from the beach laden with jewels. So will the most successful find the struggle for knowledge, success and fame, when he has left the college hall to enter the wider world with a thousand obstacles he never dreamed of, and competitions as numerous as aspirants, and unscrupulous as ambitious. Knowledge is a sacred jewel, of which labor and self-denial is the price. But agriculture must have more than colleges to educate her masses and stimulate the latent uneducated talent to its full development.

For this purpose let every township in the State, where the population will be sufficient to justify it, erect a public hall for the purpose of holding elections and other public meetings, dedicated to free public discussions upon all questions affecting the liberty, prosperity and culture of the people, so that every question discussed in churches, courts and legislatures, may be in like manner reviewed and discussed by the people themselves, that they may be able to instruct their legislators, and watch over their own interests in courts. Whilst cultivating the power of public speaking, such public discussions diffuse the entire

knowledge of the individuals among the whole people. When each of one hundred persons shall bring to the hall but one new idea, and impart it, one hundred new ideas have in this way been distributed among the entire people. Discussion would lead to investigation of all the questions involving science, philosophy, history, government, and agriculture. This will develop the full natural strength of the minds of the farmers' sons, and draw out their originality of thought. It will do more, it will break the stale monotony of the machine education, which is the curse of our common school system, as fashioned by the State Normal schools, which dwarfs the entire public mind, by moulding into one form the minds of all the pupils. Connected with the public hall let there be a public library, accessible to all the people which should contain the standard works of ancient and modern history, biography, geography, agriculture and works of acknowledged scientific character, to the full capacity of the people to sustain it. The poorest inhabited township in the State could support a good library with the money and time squandered upon the follies, vices and crimes of the people. Every such library should contain at least the code of the State, and the reports of the Supreme Court. The criminal code of the State should be read one chapter each day in the common school, to prevent the commission of crime through ignorance, the most fruitful source of crime. Let every farmer organize his family into a reading class, and have the daily news spread out before them in the evening, after each day's work has been concluded.

Let these reforms be adopted and pursued, and society will elevate itself, and the standard of morality be elevated with it in the agricultural districts. The elevation of moral standards will demand more learned lawyers and give them less business. Will force a more thorough medical education in your physicians, invite greater erudition in your ministers and purify the press, which is largely conducted to gratify the ignorance, frivolity, vanity and cupidity of the press and its patrons.

It will profit us nothing to speak of the glorious, dignified and manful occupation of agriculture; nor will it avail us anything to complain of corrupt rulers or unjust government. The government is precisely what we make it. No more humiliating commentary can be made of us than we make for ourselves. The condition of the self-respect and intelligence of the agriculturists of the United States is fully exemplified in the representation of the present Congress, which is composed of one hundred and twenty bankers, ninety-nine lawyers, fourteen merchants, thirteen manufacturers, seven physicians and one mechanic. This was the judgment which the farmers placed upon

themselves, leaving the world to receive them at their own estimate. This too, was where at least two-thirds of the voters of the United States are farmers; in the United States, whose entire wealth is based upon agriculture. Agriculture has not one single representative in Congress, that too in a representative government.

The true dignity of every profession and vocation is based upon its culture and knowledge, and firm but modest self-assertion of its rights, which will never be accorded without a resolute demand.

When the agricultural population of this country have asserted their dignity it will be respected, but not before. When they have perfected the system of home culture they will be the freest, most cultivated and most highly civilized class upon the face of the earth.

This is the proudest testimonial that can be given of true success in life—that the vices, follies and crimes of himself and family have cost neither himself nor others one farthing. This is the true ambition of the farmer's independence, that he eats his own bread, drives his own horses, hunts in his own parks, fishes in his own lakes, thinks for himself, acts independently and labors unceasingly for the good of his race. That he warms himself in no man's sunshine, and cools himself in no man's shade.

So absolutely hath God made us the arbiters of our own fortune, that every man and every class in a government like ours frames his own fortune and determines his own destiny. A great University like this may assist him and give him a fortunate start in the race of life; the final race is for himself to win or lose.

John Randolph of Roanoke, the great Virginia farmer, and the most wonderful orator that ever appeared in America, said that he had learned all that he ever knew from his library.

Patrick Henry, the great orator of the revolution, Henry Clay, the great leader of the Senate, were the humble children of farmers, who were forced to the drudgery of farm life, and from this beginning rose to imperishable fame.

Andrew Johnson and Abraham Lincoln rose from the very depths of poverty to positions in history, enduring as history itself. None of these gentlemen had ever tread the halls of colleges or universities, but supplemented this disadvantage by untiring energy and industry.

This only the more clearly demonstrates the necessity of knowledge. None the less necessary to the agriculturalist than the lawyer, statesman and physician. The study of chemistry is as necessary to the farmer as it is to the physician, if for no other reason than that the farmer should command the knowledge which accomplishes a well informed gentleman. This great science which dissolves and analyses the elements of nature, has employed nature's remedies for the recup-

eration of herself, has determined the value of metals and applied them to the practical service of man, has extracted their healing powers and applied them to impart vitality; and brought the most active poisons to minister to the health of the sick and give renewed strength to infirmity. It is not strange that the early discoveries of chemistry were ascribed by the superstitious to the devil, and the science of chemistry classed among the black arts,—the tricks of legerdemain and demonology. Watts applied science to the wedlock of the old enemy's fire and water, and enslaved them. Steam, which came of the marriage in childhood, was refractory and impracticable. Almost at the same time, Jas. Rumsey of Maryland and John Fitch of Virginia, (1785 and 1786 respectively,) attempted the application of steam to navigation, which led to an unhappy controversy and the suicide of Fitch. This is the unhappy fate of men of genius who see decades before the public mind is educated up to the appreciation of their inventions. It was Watts who discovered the possibilities of the immense power of steam; Fulton achieved the glory. To the knowledge of science are we indebted for the conquests of the nineteenth century, which has brought the Orient and Occident into near neighborhood, inhabited the ocean with traveling cities engaged in commerce, transacting business, negotiating treaties and extending the area of christian civilization to the ends of the earth. Science has harnessed iron, drawn by steam, which drives the machinery of the world. By science Franklin tamed the lightning and Morse taught it to speak in whispers to continents. When Edison's electric light shall glow out in the atmosphere and be fed by it without consuming it, like Aladdin's lamp, multiplied by millions, then will be realized the prophetic dream of revelation, and science which has conquered the elements and subjected them in servitude to man, is the missionary angel rising above the storm and bathing her golden plumage in the light of the sun, as she flies through the midst of heaven preaching the everlasting gospel of truth and liberty to the world. Science has imparted new life to the dead and fruitless earth, worn out by the tillage and toil of ages.

In Asia, where everything is economized to fertility and the support of hundreds of millions of people; Europe, which in population is only second to Asia, uses every offal to perpetuate the fruitfulness of her soil, and yet her dense population is engaged in every conceivable production for exportation, to bring back bread in return from afar. If Europe and Asia give new life to an exhausted soil, what may not be done in America, where the soil has been exhausted by bad farming, by the application of chemical fertilizers in the older, worn out soil of the Eastern States. But in Missouri our soil is new and fat, our valleys are enriched by the solutions and washings of lime from the surrounding

hills. A large portion of the State is a marl bed. The soil in many places is deep beyond the reach of the plow, but where the soils are exhausted by improvident cultivation, chemistry has brought to its relief amoniated sulphosphate of lime and other restoratives; large manufactories are engaged in its constant and profitable production, which, with guano, applied to wornout fields that had become sandy plains, now support populations which will increase with the increased production of the soil and add to the wealth of the country, and add new testimonials to educated agriculture.

No agricultural people can prosper who are not intelligent and free.

Ireland, upon whose soil nature has lavished her greatest gifts, with a climate happily adapted to the fruitfulness of her soil, by a systematic oppression has had her population reduced from 8,000,000 to 5,000,000 souls, with a corresponding depression of nearly every other interest of society. This, too, within the last half century.

England, by her oppressive landlord system, is expelling her best practical farmers from the kingdom, and is a most painful exemplification of an extensive tenantry, whether under the feudal system or controlled by corporate monopolies, or a system of privileged landlords. For dense as the population of Europe now is, under an educated system of agriculture and the soil cultivated by a free people, she could well support twice the number of her present population.

Hungary, ruled by Austria, in like manner suffers from ignorance and oppression. In this country the land has a wonderful fertility; everything—seasons, latitude and varieties of crops, minerals and fruits—combine to make it the very garden of Europe; yet not more than one-third of the land, which is easily tilled, is under cultivation. Fertilizers are unknown; even the common fertilizers of the barn yard are not extensively applied for this purpose. Barns, granaries and the ordinary conveniences of farm life are scarcely known; their farm implements are almost as rude as those of the ancients just emerging from pastoral life, a one-handled plow, wooden forks and flails to beat out the grain on the ground; vegetables, herbs and esculents that add so much to the support and comfort of families, are scarcely cultivated. From the wagon to the hoe, everything is indicative of a people yet slumbering in the lap of barbarism. Where Providence has been most beneficent, famine scourges the country and leaves the people to die or live upon charity; their rivers, which have the most wonderful water power, are without the mills or manufactories demanded by the population of the country; the roads are almost as rude as those made by the hunter and the shepherd.

Commerce can have but little prosperity in such a country, although it is bounded for seven hundred miles by the largest river in Europe, with an outlet to the sea where the ancient fleets were first floated on the waters.

Slavery is a curse which leaves its deadly blight wherever it touches the earth with its hateful feet, whether in the serfdom of Russia, the helots, the peonage of Mexico, or our own African slavery. Slavery is inimical to that general intelligence necessary to the success of agriculture. It is contrary to natural justice. In that great bill of sale delivered to Adam and confirmed to Noah, upon which the title of all property rests, there was no human being in the bill of sale. The new feudal system, with the Chinese slavery of California, in the conflict with free and intelligent labor, threatens a revolution which will involve millions of money and treasures of blood.

Missouri has agricultural facilities which might well be coveted by any country in the world. The location of our State is in the very center of the Mississippi valley, embracing every variety of its wealth and productions. It is at the same time near the geographical center of the United States, with ability to represent the productions of every part of the whole country in the fruitfulness of the soil. This is our field of action. It is the promise of the University, demanded by the expectations of the people, that Missouri shall be properly cultivated to the full extent of her capacity. There is not on the face of the earth more healthy sheep walks, affording a more abundant yield of nutritious grasses, than the hill country of this State. With the improvements in the blood, for the purposes of meat and wool, the revenue derived from this branch of agriculture alone is very great. No investment is more profitable, no employment is more elevating, and no branch of agricultural industry so happily adapted to enriching the soil, as sheep culture.

Fruit and grapes, and everything which can be grown in the temperate zone, may be grown successfully and profitably in the State.

Agriculture is the basis of our wealth, which may be improved and utilized until every other profitable industry may be built upon it, until our resources become incalculable. The true wealth of a country is never reached until all available resources are utilized and reduced to its smallest bulk, to enter the channels of commerce. No State should sell raw material which may be profitably manufactured at home.

Suppose Missouri should manufacture the cotton raised in the State and that from the country lying immediately on her border. Then the murmuring music of the mills would enliven villages and cities, and the coined wealth of the State would be treasured at home.

Let her manufacture the wool which she raises, which would add millions to her wealth and add new interest to the hum of industry and increase her revenues.

Let the entire agricultural machinery and farming implements used in the State be manufactured here, with the addition of all that may be sold abroad.

Let the furniture used in the State be manufactured in the State, and, with the immense forests of the State, we can supply any possible market.

Our coal fields are commensurate with its iron deposit, not only enough to supply the State for all time to come, but fully equal to any possible foreign demand, all of which should be worked to the fullest possible demand of the market.

Starch mills, pork packing, to be shipped in unbroken bulk to the European markets.

Cheese factories, oil factories, starch factories, in short, everything which may be worked up into articles ready for the market.

Missouri has a capacity to feed the workmen by bread and meat growing at the door of her manufactories, and could support, without the danger of want, a population engaged in agriculture and manufactures, and the commerce and transportation growing out of production.

The commerce of the State, which is supported by agricultural manufacturing, stock-raising and mining interests, must be as immense as the interests which feed it. The two great rivers of America bound it, and one of them bisects the State. Each train load of emigrants, settling west of us, are but preparing a market for our manufactures. The agriculturists of the State of Missouri ought to have a career of prosperity which will increase for centuries, and be the marvel of the world. The true success of a State—which enforces her "State rights"—depends upon her power of self-support, which commands and enforces her rights.

The true road to wealth and prosperity in a State is to develop the strength of her resources by inviting the skilled workmen of other countries among, and availing itself of their productive wealth.

The great Phillip of Macedon, who had been the student of Epaminondas, saw the incalculable value of knowledge to conquer and govern a great people. He acted upon it, and employed Aristotle to teach his son Alexander, and, by the force of his character, stimulated by ambition and directed by learning, gathered around him the first military talent of the time, gave encouragement to learning, and gained power until he felt a conquered world trembling at his feet.

Peter the Great, with his Tartar-Scythian tribes emerging from barbarism, felt the want of knowledge, and traveled until he learned

the secrets of the power of the nations of the world, and utilized them, and invited every skilled workman to make his home in the Russian empire, until it has become one of the most powerful nations of the earth, only retarded by the despotism which stamps out the vital energy and individuality of the subject. Peter the Great is one of only the few men of all ages who have learned their most valuable lessons from the chastisement of their enemies. For years Peter was whipped and driven by the armies of Charles the Twelfth of Sweden, until he had been exhausted, but educated by the conflict, when he turned upon his enemy, and drove him, as an exile, without an army, without money and without friends, having but a few desperate followers, to die among the Turks, after having endured their insults. From the bad fate and good fortune of others let us learn.

Let Missouri invite the woolen manufacturers of Europe and America to settle among us, with the spinners and weavers. Invite lumbermen from the north to work up our immense pine forests into lumber.

Let our lead be wrought into every useful and marketable form. We must penetrate every accessible part of the State with railways, until everything we have to sell is brought to the door of the market. Our wet lands must be drained and our uplands fertilized, and skilled farmers of other States invited to make their homes among us. With the wonderful advantages which surround us, nature has placed no limit upon our just aspirations. The balmy climate, variety of resources, fertility of soil which yields so gratefully to the hands of the husbandman. Here agriculture will assert her sovereignty, will cover the hills with cereals, orchards and vineyards. Here commerce, once confined to the seas, will make our rivers great avenues of moving wealth, aided by the railroads to transport our products and bring back the wealth of other countries in return. This wealth will bring with it leisure. Leisure will give opportunities for study and the cultivation of the intellect. From this study will come new discoveries in philosophy, astronomy and all other sciences from which spring the arts, from the arts come manufactories; literature will grow up as a spontaneous plant. Cities abounding in wealth, increased in productions, will cover the State; eloquence will be cultivated among her orators; music will soften the asperities of society. Warlike people will fear us; the proud will respect us. Husbanding our strength, and no longer dependent on the east for what we use, we have secured the highest of all estates, State independence. It depends upon the fiat of the people of Missouri whether these things shall be.

State pride is the child of patriotism. No country reaches a high place in history until it has first asserted its own title to equality of

rank among the nations of the earth. This has been preeminently true of the States of the Union.

It was the pride of Virginia that she gave to the world Washington, the commander of the armies that made the country free; that Jefferson, the Apostle of liberty and auther of the declaration of Independence, was born on her soil, and reared in her bosom; that Madison, the architect of the Constitution, was her honored son; that the great Chief Justice Marshall had been raised at her feet. Virginia is proud that her Patrick Henry aroused the people to the revolutionary struggle; that she gave to the old government four associate justices of the supreme court; six secretaries of state; four secretaries of war; three secretaries of the navy; four attorneys general. Chosen from her citizens were two Vice-Presidents and seven Presidents, born on her soil, with an immense army of eminent men scattered over every State in the Union.

The great leaders of the Union army—Winfield Scott and Gen. Thomas—were Virginians, who were met by Robert E. Lee, Stonewall Jackson and Johnson, with an army of Virginians, brave and true as the three hundred led by Leonidas that fell at Thermonylae. This was the secret of the grandeur and glory of Virginia, which will go down to history bright as the sun and clear as the light, that she fostered her colleges and universities. Jefferson, after having filled the highest station on earth, and the highest distinction as a philosopher, devoted the evening of life to build up and endow a State University; while his scarcely less distinguished fellow-citizen, James Madison, became rector of the university and was president of his county agricultural society. Virginia became illustrious because Virginians identified themselves with the glory of the State.

Massachusetts, that stood side by side with Virginia in the revolution, was no less tenacious of the honor of her State; boasts of her two secretaries of state, two secretaries of the treasury, four secretaries of war, five secretaries of the navy, one postmaster general, two vice-presidents and two presidents—father and son. The glory of Massachusetts has been blended and identified with her literary institutions. Edward Everett, Theophilus Parsons, and John Quincy Adams, the most learned diplomatist of ancient or modern times, were proud to serve as professors—to become the teachers of scholars, statesmen and philosophers.

When you ask a Virginian who were the model orators of the world, almost instantly he replies: Patrick Henry, Richard Henry Lee, John Randolph of Roanoke, Henry A. Wise, and William Wirt, who were all Virginians.

Turn to the Massachusetts man with the same question, and he will, with equal pride, recall the memory of Jas. Otis, Fisher Ames, Rufus Choate and Charles Sumner.

It is a passport to any man in Virginia that he was educated at the University. It is the pride of the Massachusetts man that he is a graduate of Harvard. The Bunker Hill Monument, which opened the revolutionary war, is the memorial of the heroism of Massachusetts, just as Yorktown, which closed the war, is the pride of the Virginian. No proud Virginian sends his son to Harvard to complete his education. No Massachusetts man sends his son to the University of Virginia. State pride forbids it.

Missouri has a history unique and romantic. The Louisiana purchase was the most signal triumph of the apostle of liberty—the greatest in all ages, in diplomacy—over the greatest captain that ever led an army. The central position of Missouri in the Union awakened the first great contest upon the subject of slavery. When Rufus King, the great leader of the old Federal party, met in the gladiatoral ring of the Senate with William Pinkney of Maryland, and John Randolph of Roanoke, the orator, statesman and farmer; when Henry Clay, the great pacificator, gained a most brilliant triumph in the admission of Missouri as a State in the Union.

Our civil war brought with it all of its nameless horrors, fire and sword, brutal murders and military assassinations, test oaths and disfranchisements, which always follow civil wars. But Missouri proudly survives them all. Peace, justice, equality and universal suffrage reign supreme.

Let Missouri concentrate her strength to build up her literary institutions. Let the State University be patronized and become the pride of the people. When the agriculturists of the State shall foster a pride in her literary institutions, a pride in her representation in the councils of the government, in the business, independence and glory of the State, then will the prosperity of the State increase and she take a position worthy of her resources, her kind, hospitable and generous people.

'Twas State pride that built up Rome and preserved her glory and her power. When State pride had been abandoned, Rome fell. The Italian wanderer, with sad, sunburnt face, glows with lighted countenance when he speaks of his countrymen—Cincinnatus, Cæsar and Cicero, of Scipio, Sallust and Seneca of Rienzi, Dante and Columbus, and sighs for his perpetual summer home when he hears the name of Afieri and Garibaldi, and glories in his home, which as far back as history is reliable, has produced and reproduced a greatness which seems imperishable.

When Missouri develops her wealth, builds up her literary institutions and asserts her independence by making herself independent, then will her people have a just right to be proud of her wealth, her intelligence and her power.

THE AGRICULTURAL COLLEGE--WHAT WE INTEND TO DO.

COLLEGE PAPERS—NO. I.

We mean to make the College and its Farm, which contains a diversity of soils, the experimental station of the State, where every variety of farm produce can and shall be tested according to the most approved practical methods. It is not enough that the student be instructed in the theory and science of all agricultural and horticultural pursuits, but he must also have the opportunity to see all operations on the farm, in orchard, vineyard, fruit garden, nursery and green-house, performed and practiced by himself until he becomes proficient in them. Only practice makes perfect. He may have the clearest theories in his head, and yet, when he comes to apply them practically, he may find many modifications necessary, many "sleights-of-hand" and advantages which are only acquired by practical experience. If he intends to be a farmer, he should make himself familiar with the most approved methods of preparing the soil for his crops, and the best and most advantageous implements; he should also know how to use them practically and understandingly, and be able to explain why they are the best for his purpose. He should be familiar with the use of fertilizers for the different soils and crops, and the after cultivation of each crop raised on a farm, with the different breeds of domestic animals, their management and care. Every farmer should also know enough of horticulture to have a full supply of fruits (that greatest luxury and best addition to family diet) constantly on his table. Therefore, our students should know how to plant and take care of an orchard and fruit garden, and they should know the best varieties to plant; and if they intend to become nurserymen or florists, they should have the opportunity to acquire a knowledge of all the operations connected with the propagation and care of trees and plants. We intend, therefore, to make this a model farm in every respect, where the student has

the chance to work in the harvest field, the barn yard, the orchard, fruit and vegetable garden and propagating house, where he can be taught to graft and to bud, to grow the most delicate plants from seeds and cuttings, as well as to cover his farm with waving corn and luxuriant meadows. And during vacation time, when they return home, they must be fitted to adorn and improve the old homestead. We want to send them out as so many missionaries of improved culture, to stir up the old leaven in their neighborhood, and to help give us what this State needs above all other things: a thinking, intelligent, working community—farmers worthy of the name, instead of the apologies for them, of which we see but too many wherever we may turn, in every township and corner of the State. And as we must necessarily have a a nursery—an extensive and varied one—to furnish our students with the means of practical instruction, we intend to supply the people of the State with the products of it. We will give them a chance they have never had before, to cut the itinerant tree peddler with his exorbitant prices, who brings his stock from Tennessee, Ohio and New York, and often makes twenty varieties from one row, (for labels as well as paper are patient,) and who will charge a dollar for an inferior tree, simply because it is far-fetched. We will give the local nurseries of the State, which now seldom grow a full stock of all that should be in a nursery, a chance to buy at home, at low rates, what they now get from abroad, so that they can replenish at any time, and thus aid them instead of competing with them. It can easily be seen that such an institution cannot afford to be incorrect, and that we will be able to guarantee what we sell, true to name and of the best quality. Do not our farmers see how many thousands that are now thrown away by them, annually, could be saved for them, and that one-half of the amount which they now buy would supply them with reliable trees and shrubs instead of the worthless trash they are so often supplied with now? They will profit by our experiments; the tables furnished last year should show them what has already been accomplished in wheat, corn, oats and potatoes. We intend to do the same in everything, test all that seems of promise, and hold fast and disseminate only what is found good.

This is what we intend to do, farmers of the State. Will you help us to do it? Or will you sit idly by, give this institution the cold shoulder, sneer at book farming and permit the farmers you send to your Legislature to slight it systematically. You must work out your own salvation, as it seems we must do it here; but how much easier would be the task if we worked together for the same object—the prosperity of our farming community and the prosperity of the State. They are, and always will be, identical.

THE MEANS WE HAVE TO DO THE WORK.

COLLEGE PAPERS NO. 2.

We have on the college farm 640 acres of land, of which about 200 are clear, and the different crops are parceled out as follows: Corn, 65 acres; wheat, 45 acres; oats, 20 acres; meadows, 35 acres; artichokes, 3 acres; potatoes, 2 acres: and about 30 acres in orchard, vineyard, small fruits, nursery and vegetables. This leaves 440 acres yet uncultivated, of which 240 may be set down as unfit for anything, except sheep pasture and perhaps pears and cherries, though some of it is too rocky even for that. Of tillable land, there may be 200 acres more than we now have in cultivation. The soil is not very rich, but it is what we call kind soil—works well—and if plowed and subsoiled, stands drouth remarkably well. If it did not, we would be burnt out entirely this spring, for we have not had a penetrating rain all the season.

On this land there is a large and commodious farm house, now occupied by Prof. Swallow, the Dean of the College, whose whole-souled hospitality has the latchstring always hung out, to accommodate visitors who may wish to inform themselves about our doings, and which also receives a number of our students while they are pursuing their college course; also a house with four rooms, now occupied by Prof. Tracy, on the horticultural grounds; also a barn, which most of our farmers would call second, perhaps third-rate, and an old shed for a tool house. There are two cisterns near the farm house, and one near Mr. Tracy's residence. We have the Hinkston creek meandering in tortuous windings through our lands, but a mile from our operations, with several springs scattered about on distant parts of the farm. These are our means of irrigation.

On part of the horticultural grounds there are also two club houses, where about forty students can find rooms and board during their course of studies, and which are generally filled to overflowing. Board, washing and room rent does not cost them over $2 per week here, and those who are willing to work can generally earn that much during the week

by work on the farm or horticultural grounds during Saturday and after University hours in the afternoon. These have a living well of water, from which we had to carry many thousands of buckets to keep our young plantations alive during the terrible spell of dry weather.

We have two reapers and mowers, two riding plows, a fair number of walking plows of the best kinds (presented to us at the plow trial of 1877), and a rather scanty supply of other implements; but we must take our machinery apart to store it during the fall and winter, as we have only an old shed and the barn for tool houses.

We work generally on the ten-hour system, but our students are paid by the hour for all the time they can well spare from their studies, and they work with a will. We, who have to oversee the work—Profs. Swallow and Tracy, and Mr. Maddex, the farm superintendent, and myself—have the privilege to work as much as we please, making about eleven hours during the day, and three or four besides, by candle light, of work with brain and pen. There are no drones in our bee-hive, and the intelligent labor of "our boys," now that vacation has commenced, forms indeed a pleasing contrast with the labor of our colored brethren, on whom we had to depend mostly when I came here. I have a lot of hands now with whom it is a pleasure to work during the day, and who can go to their homes, when their course is over, as men fit to take charge of any farming or horticultural operations. Our orders from headquarters are to keep "no lazy boys," and we carry them out to the letter.

We have on the farm four mules and three horses, besides Prof. Swallow's team, which last, during this dry spell, has mostly been kept busy hauling water to our suffering plantations. We have sixty cattle over one year old, fifteen calves, a Short-horn bull and two heifers, a Jersey bull, nine sheep (four Lincolns, two Cotswolds and three Leicesters), and thirty-five Berkshire and Poland China hogs.

The farm is paying its way, and has a small surplus, according to inventory just handed in. The stock in nursery, at lowest wholesale rates, amounts to about $900. The floral department has an old pit, a shed with a glass roof, without heating apparatus of any kind, simply to keep plants over summer, and about $100 worth of plants in pots, besides the plants that have been bedded out. Market gardening is also carried on to some extent, and vegetables find a ready sale. But with this dry weather, and no means of irrigation, the supply is cut very short. The orchard has set but few apples; but the grapes, about two acres, mostly Concord, promise a very fine crop.

Besides this, we have $1,200 allotted us, per year, to make improvements, buy stock, tools, apparatus, &c. We have the scientific building for our use, with its cabinet, herbarium, a collection of models from

the agricultural department, its lecture and class rooms—last, but not least, where our students are taught the science and lay the foundation for their practical labors in the field. But for this and the farm, we have to thank the liberality of the citizens of Boone county, who contributed $90,000 to have the college established here.

This is a summary of the means we have to build up our Agricultural College and accomplish the task we have alloted to us—an outline of which I have tried to give in No. 1.

WHAT WE COULD DO, HAD WE THE MEANS.

COLLEGE PAPERS.—No. 3.

This opens such a wide field, and the range of work before us seems so unlimited, that it would seem impossible to define all we could accomplish, in the space of a single short paper. I will, therefore, only name a few of our most pressing wants, which could have been met by only a little timely aid from our Legislature. I will divide these into two departments—one of which could have been mostly accomplished by the convict labor for which we asked but did not obtain; the other, for which the outlay of capital is needed, although it need not be a very large amount.

1. We could provide artificial irrigation for our small fruits and vegetables, and for part of our nursery stock—(the severe drouth through which we have just passed shows the need of it)—by making a well of living water at the upper part of our horticultural grounds, and at an outlay of about $250 we could erect a small wind mill to pump the water into a reservoir, from which it could be dispensed over all our plantations there, thus saving thousands of dollars every year. If we had had this means of irrigation, we could have saved and sold $300 worth of strawberries this season, and saved at least $300 worth of labor and young plantations just set out; but we had not the means and thus, as a poor expedient, had to haul water from the creek, a mile, and carry it in buckets and watering pots. If we had not done this, everything planted with so much labor and expense this spring, would have been lost.

2. We could build stables for our suffering animals, in which they could be sheltered from the cold in winter, for which the greater part of the material is on the land belonging to the farm, and which could have been worked up by the convicts. Last winter the expedient resorted to was straw sheds—and we shall have to make them again or run the risk of losing the animals, which now furnish a considerable part of our income.

3. We could build tool houses for our farming implements. Now we must take our farm machinery apart every season to keep it out of the weather, and stack it in a corner of the barn, already crowded by grains and other stores. We could build larger barns to store our grains in, and teach our students to do the same, thus avoiding an immense waste.

4. We could build green-houses and propagating houses, where we could teach our students the propagation of all kinds of plants, their care and after management, and from which a large amount could be sold to the lovers of horticulture, of better quality and at less price than they are now paying, thus giving us a source of income to assist us in improving further.

5. We could clear our barren lands, build division fences, and make them valuable and useful as pastures, instead of producing thorns and scrubs, as they now do. We could improve our roads, build packing sheds, make our own boxes for packing, etc. We could build a substantial and handsome fence around our grounds, etc.

All this we could have done without much expense on your property, people of the State, if your Legislature had given us the convict labor we asked for, and for which we could have grown nearly all they consumed, thus saving the expense of feeding them to you. Is not this your property as much as the court rooms, legislative halls, Governor's Mansion and streets of Jefferson City (on which they are put to work and where they say they have no work now,) and much more so than the coal mines at Montserrat, where they are hired out to other parties? We are met with the assertion that our students should do the work on the farm. It is just what they are doing. I have a number at work for me during vacation, so have Prof. Tracy and Mr. Maddex, and a more faithful and intelligent set of hands than these farmers' boys are—some of them studying law and medicine—I never had. Cheerful and content from early morn until late at night, they work with a will, and think and study while they work. But we do not think that they were sent here to split rails or to grub and quarry stones. These operations they have a chance to learn and practice at home. We think they were sent here to be taught the science of farming, of horticulture and of gardening, in the class room; to learn to apply it

practically outdoors—and we work them on the farm, in the orchard, nursery, vineyard and vegetable garden—would work them in the green-house if we had one—and in landscape gardening. We want to teach them to farm profitably, and to enjoy the fruits of their labor, as only intelligent men and women, who know why they are working and to what end, can enjoy them. There are no drones in our beehive, and those who superintend the work know of no ten hour system for themselves, although their hands may be worked by the hour. They are well aware of the constant need of supervision, and what they do with brain and pen must often be stolen of the small still hours, when you may be asleep in your beds.

With just a little timely aid in money, we could complete our apparatus, give our nursery and green-house the necessary stock of trees and plants, buy improved breeds of cattle and sheep, and put the College on such a basis that it would pay well. Now we must earn what we spend, and of course cannot work as cheaply or as well as if we had a fair start. The Legislature stands doubly pledged to give us such a start: First, to the General Government, when they accepted the land grant; again, to the people of Boone county, who donated the farm and $30,000 in cash to get the College established here. What we ask is, only a small send-off; put us on a working basis and we will help ourselves, as well as aid the farmers of the State—more than they have any conception of.

WHAT HAS BEEN DONE WITH THE MEANS WE HAVE.

COLLEGE PAPERS NO. 4.

The farm has been put on a good working basis, so that 170 acres are now profitably farmed, and turn out a small surplus every year. A series of experiments have been conducted for several years, among which I will mention:

1. Testing the value of the subsoils of our lands by deep plowing and trenching, which has already proved that they are almost inexhaustible, corn having been grown on the same soil for a period of over fifty years—still producing good crops.

2. Experiments with fifteen varieties of Indian corn to test their yield and comparative value as farm crops.

3. Experiments with wheat and oats, comprising about sixty varieties of the first and ten varieties of the latter.

4. Experiments with about 200 varieties of potatoes, to test their comparative value, on the same soil and with the same culture.

5. We have a small stock of improved cattle, hogs and sheep, which will be increased as fast as means permit, and common cattle for grazing—about 70 head.

The orchard, fruit garden, vineyard and nursery contain over 300 varieties of fruits of all kinds, and about as many more of evergreen and deciduous trees and shrubs of all kinds. All of these we intend to test fully, propagate them, and give the people of the State the benefit of our experiments by selling to them what we have tested, guaranteed true to name, and at less price than the unsalable stock they have been purchasing from many of the dealers throughout the State. We have ten agents in the field already, mostly students of the institution, and whatever is purchased from those having our certificates, may be strictly relied on. To the nurserymen of the State we offer an exchange of any reliable surplus stock they may have, for such stock as they may need, which we will furnish to them at lowest wholesale rates, and thus we hope to benefit them, instead of running against their interest. We are converting the campus of the University and the lawn on our farm into arboretums, where all the hardy trees and shrubs can be found, properly labeled, and thus form an interesting study, not alone for our students, but for the lovers of trees and botanists of this and other States.

We are testing for hedges, the osage orange, honey locust, thorn and American arbor vitæ, under different modes of training, and can show as good and impenetrable a hedge of the former as can be seen anywhere.

The same course is followed in regard to vegetables and flowers, although the latter cannot be cultivated and grown properly without the help of a green-house and propagating house.

Our course of instruction to our students now consists of one year of preparatory English studies, two years of horticulture, gardening and fruit culture, and two years of farming, accompanied by literary and scientific studies in all the branches taught in our University, to which our students have free access, and in which they are on an equality with the students of other courses, accompanied by practical instruction on the farm, nursery, orchard and garden, besides, we give them lucrative employment during all their leisure hours and during vacation, either here or as our agents in different parts of the State.

We hope to fit them for the work of horticultural and agricultural missionaries, not among the heathens of distant isles, but at home among their relatives and friends.

Most gratifying indeed would it be to us all, if the College could be managed as a great benevolent institution, which could dispense its benefits and its products gratuitously throughout the State. We should be happy to do all this, if the means were put at our disposal. But when we must earn all we spend, we must make our College self-sustaining, and must sell what we produce, to enable us to work at all.

GEORGE HUSMANN.

COLUMBIA, Mo., July 4, 1879.

THE COLLEGE AND THE PEOPLE.

COLLEGE PAPERS—NO. V.

In my former papers I have tried to give a true and full synopsis of what has been done and what we intend to do. For the full confirmation, for the proofs of the case, we have invited all, and do so still, to come and see for themselves. And now a word to you, farmers of the State, nay, all its citizens—for are they not all interested in the progress of agriculture? Are we not all common sufferers when farming interests suffer; and can any commonwealth expect to flourish when she neglects her agricultural interests? Therefore, this appeal is made to all, but especially to those in whose immediate interests we are working, whose calling we seek to elevate above the common daily drudgery of the poorly paid farmer, to the intelligent, thinking, paying labor of the "lords of the soil," the proudest and most independent avocation man can follow.

If you think, from what has been shown you in these life sketches, (and of the truth of which you can convince yourselves any day,) that we are doing our duty by you, that we are working for and in your interest, that more has been accomplished than could have been expected with the means so niggardly eked out to us, and that we are worthy of the trust which has been placed in us, then see to it that you do your duty as well. Give us your active sympathy, your earnest co-operation, show us that you appreciate our labors, that the College has a friend in

every homestead, however humble and remote, and that you feel it to be your institution, which you will help to sustain and develop, so that it can help you in return. We are determined to do our duty, but how much more pleasant and easy is the task when we know that our exertions are appreciated. Do not look upon education as a drawback to the work of the farm, but as its best aid. Send your sons and daughters to us, that we can impart the "book learning" to them in the class room, and teach them outdoors to make the practical application, and that they can return to you fitted to take charge of the old homestead and make it a home indeed—pleasant for you in your declining years, and dear to the generations yet to come. See to it at the next election that none be sent to the legislative halls but such as are our friends and yours; men who are willing to build up this great State, and push it onward to where it belongs, instead of retarding its progress by narrow-minded "penny wise and pound foolish legislation."

Can you deny that this is your duty? Then see to it that you do it. We will do ours.

GEORGE HUSMANN.

COLUMBIA, July 29, 1879.

THE AGRICULTURAL COLLEGE—HORTICULTURAL DEPARTMENT.

In the horticultural department of the College considerable progress has been made during the past year in clearing up new land, grubbing trees, and preparing it for cultivation. The most important feature, however, is the erection of a green-house which has long been wanted, and now that more is being done in the fruit department than formerly, it seems an absolute necessity to have a propagating house. Last fall a fine collection of plants were offered the college on condition that a house should be provided for them, and in October last, work was commenced, and before Christmas the plants were in the house.

The house is but a short distance from the University building, and far enough from the street and from other buildings to admit of the grounds about it being tastefully laid out and ornamented with such plants as will endure outdoor culture, and be of interest and value to

students and visitors. The green-house is 24x100 feet with side walls of brick, and all the work has been done so as to make the building a substantial and permanent one. Fifteen feet of one end is used for furnace and potting room, and also furnishes a seed and work room—under these rooms is a cellar for storing boxes, coal, etc. The remaining eighty-five feet of the building are used for plants. In the middle of this part is a cistern, holding about 400 barrels of water which is collected from the roof. The cistern is floored over, and above it is a series of shelves on which plants are placed. The part of the building not occupied by the cistern is utilized as a tropical garden, in which such plants can be placed as need an abundance of room for their roots, and cannot endure being planted out of doors. Among the plants in this bed we notice a number of palm trees, tea and coffee plants, quinine trees and the South American walnut. Along each side of the house is a bench for small plants, and broad walks extending the entire length of the house give visitors every convenience for examining its rare and interesting contents.

The heating apparatus for the house was furnished by Branch, Crookes & Co., of St. Louis, and consists of a sectional boiler to which is attached six hundred feet of four-inch pipe, so arranged as to give a constant flow of warm water from the boiler to the opposite end of the house, where the pipe turns and conveys the water back to the boiler to be reheated and again carried out after the manner of an endless chain.

Although it is but little more than two months since it was completed, the assortment of plants now in the house is an unusually interesting and valuable one. Among the rarer plants are noticed black pepper, cinnamon, allspice, the acacia, from which the gum arabic of commerce is extracted, the mango tree, olives, quinine trees, date palms, a diminutive specimen of the giant tree of California, several species of eucalyptus or Australian fever trees, the cochineal cactus, the arrow root plant, the cashew nut and sago palms, palmetto, lignum-vitæ, tamarind, croton oil plants, anise and cardamon plants, five species of the India rubber tree, the tapioca plant, and the carob tree, which furnishes the "husks" mentioned in the scripture as the food of the prodigal son. Of course the house contains a large assortment of roses, geraniums, verbenas and other bedding plants, as it is designed not only to serve as an aid in teaching, but also to be a source of profit to the College.

This addition to the appliances of the Agricultural College will not only be the source of considerable pecuniary profit, but will be of inestimable value to both teachers and pupils in the study of botany.

RAILROADS IN MISSOURI.

At the close of the year 1879 there are, in round numbers, 3,600 miles of railroad in operation in the State of Missouri, embraced in some fifty different main lines and branches, all owned by thirty-five different corporations and operated by twenty-five different companies, as shown in the following table:

Companies Operating Railroads in Missouri January 1, 1880.	Miles.
Atchison, Topeka and Santa Fe	22
Burlington and Southwestern	64
Cherry Valley	6
Chicago and Alton	264
Chicago, Rock Island and Pacific	169¼
Crystal City	4
Hannibal and St. Joseph	291½
Kansas City and Eastern	45
Kansas City, Fort Scott and Gulf	8
Kansas City, St. Joe and Council Bluff	198
Little River Valley and Arkansas	27
Missouri, Iowa and Nebraska	70
Missouri, Kansas and Texas	284
Missouri Pacific	376
Quincy, Missouri and Pacific	75
St. Joseph and Des Moines	45
St. Louis, Hannibal and Keokuk	48
St. Louis, Iron Mountain and Southern	880
St. Louis, Keokuk and Northwestern	132½
St. Louis, Salem and Little Rock	45
St. Louis and San Francisco	363½
Springfield and Western Missouri	20
Union Railway and Transit Company	1
Wabash, St. Louis and Pacific	655
West End Narrow Gauge	16
Total	3,607

Besides the above enumerated number of miles operated by railroad companies as common carriers for the public, there are sixteen miles operated by mining companies for their own special purposes, which makes a total of 3,623 miles, and, in addition, there are four miles of track laid several years ago on the Cape Girardeau and State Line Railroad, which has never been used.

In 1877 the gross earnings within the State were.....$15,000,000 00
1878 the gross earnings within the State were..... 16,000,000 00
1879 the gross earnings within the State, estimated.... 18,000,000 00
1879 the net earnings, estimated..... 6,000,000 00

REPORTS

OF

Agricultural and Mechanical Societies.

NEWTON COUNTY AGRICULTURAL AND MECHANICAL SOCIETY.

NEOSHO, Mo., November 1, 1875.

To the Secretary of the Missouri State Board of Agriculture:

DEAR SIR—I beg leave to tender you our seventh annual report:

Number of members, 212. Number shares of stock, 270, at $10.00, $2,700.00

The Society has a 99-year lease on 15½ acres of land, which is inclosed by a substantial fence. The grounds are well watered by a stream running the full length of the inclosure. The Society has on the grounds, stalls for horses and cattle, yards and pens for sheep and swine, a commodious hall for the exhibition of indoor goods, a grand stand to accommodate 1,000 people, and other buildings. The Society have a one-half mile track.

The value of the property and the improvements to the grounds at first cost has been the amount of stock issued by the Society, that is, $2,700.00.

Number of premiums paid, 260; amount, $725.00.

NUMBER OF ENTRIES.

Horses, 59; mules, 7; jacks, 3; cattle (Short-horns,) 20; graded cattle, 16; swine, 25; sheep, 37.

While the number of animals exhibited is not large, yet each year has shown a marked improvement in character.

As to the staple commodities of the county, while not being able to give amounts raised, will state that wheat was an average crop; corn, one-half crop; potatoes one-half crop; no fruit.

The officers of the Society are: J. M. Z. Withrow, President, Neosho; R. J. Henderson, Vice-President, Neosho; J. C. Herms, Treasurer, Neosho; John M. Sherwood, Secretary, Neosho.

Most respectfully submitted,

JOHN M. SHERWOOD,
Secretary.

CALLAWAY COUNTY AGRICULTURAL AND MECHANICAL SOCIETY.

President, Charles A. Bailey, Fulton, Missouri. Treasurer, S. L. Dedman, Fulton, Missouri. Secretary, B. P. Bailey, Fulton, Missouri. Directors, C. A. Bailey, Wm. King, H. F. Renoe, J. W. Overton, W. Y. Palmer, J. D. Cason, W. F. Harris, R. S. Shields and Jeter Walthall. Number of members, sixty.

Time of holding fair, third Tuesday in August.

Amount offered in premiums 1879, $2,300; amount paid in premiums 1879, $2,000.

Number of Entries.

Cattle, 50; horses, 438; sheep, 37; hogs, 15; machinery, 10; farm products, fruits and flowers, 300; textile fabrics, 40; miscellaneous, 50.

FINANCIAL EXHIBIT.

RECEIPTS.

Gate fees	$1,715 80
Booths and stalls	690 95
Entry fees	690 00
Miscellaneous	143 25

EXPENDITURES.

Premiums	$2,000 00
Printing and advertising	50 00
Music	198 00
Improvements	400 00
Miscellaneous	400 00

REMARKS.

The financial condition of the Society is good; have about $1,200 on hand, and do not owe anything.

B. P. BAILEY, Secretary.

HARRISON COUNTY AGRICULTURAL AND MECHANICAL SOCIETY.

President, Thomas Monson. Treasurer, Joseph Bartlett. Secretary, David J. Heaston. Directors, Thomas Monson, Joseph Bartlett, Joseph Webb, S. F. Claytor, J. E. Hitchcock, Geo. England, J. C. Baker, D. D. Boyce, J. Barlow and D. R. Walton. Number of members, 72.

Time of holding fair, October 7, 1879.

Amount offered in premiums 1879, $800; amount paid in premiums 1879, $600.

NUMBER OF ENTRIES.

Cattle, 37; horses, 69; sheep, 19; hogs, 26; poultry, 11; machinery, 5; farm products, fruits and flowers, 27; textile fabrics, 32; miscellaneous, 180.

FINANCIAL EXHIBIT.

RECEIPTS.

Gate fees	$1,175 00
Booths	40 00
Entry fees	105 00
Miscellaneous	35 00

EXPENDITURES.

Premiums	$600 00
Printing and advertising	35 00
Music	75 00
Improvements	125 00
Police, etc	80 00
Balloon	75 00
Miscellaneous	220 00
Balance applied on indebtedness	145 00

DAVID J. HEASTON, Secretary.

NODAWAY COUNTY AGRICULTURAL AND MECHANICAL SOCIETY.

President, Simeon Wright. Treasurer, Thomas H. Brown. Secretary, A. P. Morehouse. Directors, Simeon Wright, Henry Linville, Thomas H. Brown, L. Miller, S. T. Kennedy, J. N. Wray, John Ham, Frank Bellows, M. B. W. Harmore, A. Strugley, Thomas Marlin and A. P. Morehouse. Number of members, too many to name. Joint stock $20 per share, and $3,600 issued.

Time of holding fair, September 9, 1879, continuing six days.

Amount offered in premiums 1879, about $3,500; amount paid in premiums 1879, $2,908.35.

Number of Entries.

Cattle, 68; horses, 215; sheep, 45; hogs, 68; poultry, 20; machinery, 75; farm products, fruits and flowers, 465; textile fabrics, 215; miscellaneous, not enumerated above, 350; we had 1,500 entries.

FINANCIAL EXHIBIT.

RECEIPTS.

Gate fees	$3,267 00
Booths	1,016 45
Entry fees	647 70
Miscellaneous	268 50

EXPENDITURES.

Premiums	$2,908 35
Printing and advertising	174 00
Music	110 00
Improvements	938 90
Miscellaneous	204 30
Paid on debt	800 00

Remarks.

We are nearly out of debt, and are making substantial improvements every year, and think we will have the best fair in the State.

A. P. MOREHOUSE, Secretary.

HENRY COUNTY FAIR ASSOCIATION.

President, W. D. Tyler. Vice-President, Hon. Wm. H. Cock. Treasurer, Geo. Y. Salmon. Secretary, Thos. Day. The officers are the Directors. Own no grounds; used grounds of an exploded association.

Time of holding fair, October 2, 3 and 4. The amount offered in premiums in 1879, was $800.00; paid, $800,00.

NUMBER OF ENTRIES.

Cattle, 68; horses, 131, and 21 mules; sheep, 21; hogs, 20; poultry, 31; machinery, 15; farm products, fruits and flowers, 175; textile fabrics, 50; miscellaneous, 80.

FINANCIAL EXHIBIT.

RECEIPTS.

Miscellaneous	$1,320 00

EXPENDITURES.

Premiums	$800 00
Printing and advertising	5 20

REMARKS.

Organized on temporary plan, and premiums offered on the pro rata plan this year, paid in full.

THOS. DAY, Secretary.

FRANKLIN COUNTY AGRICULTURAL AND MECHANICAL SOCIETY.

President, D. P. Wood. Treasurer, L. Wattenberg. Secretary, Oscar H. Guether. Directors, D. P. Wood, I. M. Ming, John A. Collins, H. Poppenhusen, A. McCallister, H. H. Beinke, Gordian L. Busch, Adolphus Frick and J. H. Pugh.

Number of members, 163. Time of holding fair, in 1879, Sept. 24, 25 and 26. Amount offered in premiums, 1879, $911.00; paid, $749.00.

Number of Entries.

Cattle, 27; horses, 84; sheep, 15; hogs, 14; poultry, 52; machinery, 21; farm products, fruits and flowers, 240; textile fabrics, 179; miscellaneous, 29.

FINANCIAL EXHIBIT.

RECEIPTS.

Gate fees	$786 50
Booths	194 00
Entry fees	182 05
Miscellaneous	261 00

EXPENDITURES.

Premiums	$749 00
Printing and advertising	148 00
Music	100 00
Improvements	43 30
Miscellaneous	248 00

BOONE COUNTY AGRICULTURAL AND MECHANICAL ASSOCIATION.

President, William H. Bass. Treasurer, John S. Clarkson. Secretary, Walter W. Garth. Directors, J. I. Sterne, Odon Guitar, W. L. Victor, Jas. P. Horner, J. C. Orr, G. C. Swallow, M. G. Quinn, B. A. Watson, T. W. Huntington. Number of members, 160.

Time of holding fair, September 7th to 11th inclusive, 1880.

Amount offered in premiums in 1879, $2,645.00; amount paid $2,467.50.

Number of Entries.

Cattle, 65; horses, 324; sheep, 28; hogs, 63; poultry, 11; machinery, 9; farm products, fruits and flowers, 89; textile fabrics, 126; miscellaneous, 258.

FINANCIAL EXHIBIT.

RECEIPTS.

Gate fees	$1,623 25
Booths	639 00
Entry fees	1,155 00
Miscellaneous	188 75

EXPENDITURES.

Premiums	$2,645 00
Printing and advertising	116 56
Music	210 00
Improvements	1,242 68
Miscellaneous	174 75

REMARKS.

We have a splendid new half-mile track, which will be in elegant condition for the fall races.

W. W. GARTH, Secretary.

ANDREW COUNTY.

Organized January 29, 1841. Total taxation in 1879, $79,009, besides schools; assessed value, $4,936,400. Andrew county owes not a dollar, and its people are in as good a financial condition as any county in the West. It is one of the garden spots of Missouri and the great West. It is the first county north of St. Joseph, and has that city for a convenient market for its immense products of grain, fruit, pork and vegetables. Its breadth, east and west, is from sixteen to twenty-three miles, and north and south about twenty-one miles. At the time of its first settlement, about 1840, it embraced about equally prairie and timber. The north and eastern portions being broad, rich prairie land, and the south and western portions were covered with timber, comprising black walnut, hackberry, oak, hickory, ash, elm, linn, mulberry, locust, hard and soft maple, and many other varieties, all of excellent quality. It comprises about 273,000 acres of rich, tillable land, containing a population of about 20,000 inhabitants. The southwest half of the county was originally timbered and somewhat rolling and adapted to grain rais-

ing; the northeast is prairie and nearly level,and although good for grain, especially adapted for grazing. The soil of the country is rich and deep. It is a black mold, the remains of decayed vegetation which has accumulated to a depth of from two to four feet, having for a subsoil a calcareo-silicious clay, known as marl, which, when thrown to the surface from the bottoms of the deepest wells and allowed to stand the freezing of one winter, has produced, without manuring, almost equal with the black mold itself. The prairie lands are convenient to timber, the latter extending along the numerous water courses of the county. The principal streams are the Nodaway, Hundred-and-two, and Platte rivers, running south through the county, and the Missouri river with its tributaries on the southwest. Mineral resources are coal, but not yet paying, a bed of steatite with other indications, also good stone quarries. Factories, mills, etc.—there are ten flower mills, several small woolen factories, and a pork packing house. Three railroads traverse the county. The main line of the Kansas City, St. Joseph and Council Bluffs line follows up the Missouri river on the southwest border of the county. The Hopkins branch, being on a through line from Chicago to the West, passes through the centre of the county, commencing at Amazonia, on the main line, and passing through Savannah, the county seat, and Rosendale and Bolckow, all thriving towns. The St. Joseph and Des Moines (a narrow-gauge) railroad passes through the southwestern portion of the county, affording a convenient and cheap outlet for produce in the eastern part of the county. Cosby, Helena and Union Star being stations on the road, so far located. Educational facilities—86 school houses; school fund, $63,000. Banks—Savannah Savings Bank and Farmers Bank of Andrew county. Newspapers—Savannah Reporter, Republican; Democrat, Bolckow, Independent; Bugle and Standard, Temperance.

Live stock.	Number.	Value.
Horses	8,039	$296,354
Cattle	19,984	230,921
Sheep	10,970	10,057
Hogs	64,913	100,191
Mules	1,852	80,440
Jacks and Jennets	84	4,285

Forest culture or tree planting—Nature has been prolific and we have done little. Hedge fences—On the prairies, the majority of fences are, or soon will be, Osage Orange. Land drainage—Very little done; underdraining would often pay.

BARRY COUNTY.

Organized in the year 1835. Present population at least 12,500. Face of the country and quality of the soil—Rolling prairies, some bottom land; black loam and gravelly soil with clay foundation. Timber and building stone plenty. Principal streams are Flat and Shoal creeks and Roaring river. Mineral resources are lead, zinc and iron. Factories, mills etc.—One woolen factory, ten grist mills and five saw mills. Exports are wheat, oats, rye, corn, cattle, hogs and sheep. Educational facilities, number of public schools, amount of school fund—Seventy-two public schools; facilities good; amount of school funds, about $15,000. Principal towns are Cassville, Washburn and Corsicana. Newspapers—Cassville Democrat and Cassville Republican—both are weekly papers.

AGRICULTURAL PRODUCTS AND YIELD PER ACRE.

Tobacco, 1,000 pounds; corn, 30 to 60 bushels; wheat, 12 to 20 bushels; rye, 15 to 25 bushels; oats, 30 to 50 bushels; timothy hay, 2 to 4 tons; clover hay, 2 tons; timothy seed, none threshed; clover seed, none threshed; vineyards, only for family use; orchards, 2,000 in the county; small fruits and berries not extensively cultivated, but do well.

Forest culture or tree planting, none; hedge fencing kind, and number of miles—Osage, but few miles, timber too plenty; land drainage—none worth reporting; results good when tried.

BARTON COUNTY.

LOCATION, SETTLEMENT AND ORGANIZATION.

Barton county is situated in Southwest Missouri, and adjoins the State line of Kansas on the east. It is 112 miles south of the Missouri river at Kansas City, and 65 miles north of the Arkansas State line.

The counties immediately surrounding it are Jasper county on the south, Dade county on the east, and Vernon county on the north. In size the county is 29 miles long, east and west, and 20, north and south; and contains about 580 square miles, or about 375,000 acres of land. The first settlement was made about the year 1838, at which time the territory now comprising Barton county was embraced in Jasper county. The first attempt at forming a separate county organization was made in 1855, and the organization completed in 1857, at which time the new county was but sparsely settled; and the United States census taken in 1860, gives the population at that time as 1,796, and at present the population is about 9,000 and steadily increasing. The people are generally from the north and east, mostly from the States of Iowa, Illinois, Indiana and Ohio, and as substantial and thrifty a class of men as can be found in any new country in the West.

SURFACE AND SOIL.

The face of the country is generally level or gently undulating, without any of the sudden breaks or high hills that are so often found in the West. It is all well drained by numerous shallow draws or ravines, the bottoms of which are perfectly firm and solid, and such a thing as wet, marshy land, with its attendant malaria, is unknown.

About nine-tenths of the county is prairie, composed of three different kinds of soil, black, gray and mulatto, all of which are rich and productive. The black is most sought after, owing probably to the fact that most of the settlers are from States where that class of soil predominates, and their early education prejudices them in its favor, though the test of time and experience proves that either of the other kinds will produce fine crops of all the leading productions. Being situated at a high elevation forbids there being any very large streams or rivers that would impede travel or require expensive bridges, but various babbling brooks and rippling streams flow through the thick foliage that skirt their banks, blessing Barton county with their presence and affording, upon most of the farms in the county, an ample supply of water for stock and all practical purposes, and rendering the physical appearance of the country so beautiful that nature seems to have exerted her utmost to make this one of the most delightful places in the western country.

Coal.

It is impossible for one not familiar with the county to fully realize the vast amount of fine bituminous coal that underlies the whole county. The State Geologist, in his report to the Legislature in 1874, says:

"Barton county is underlaid by about 503 square miles of coal measure, including, with the mounds, a total aggregate thickness of about 300 feet. * * * * Of 503 square miles of coal measure in this county there are about 480 underlaid by an aggregate of 4 feet of good coal; with this is included a strip of 31 miles of the county underlaid by 6½ to 7 feet of good coal."

As yet these vast deposits have been but little developed, but the time is not far distant when the valuable coal fields of this county will be opened up and utilized, thus affording useful employment to many people, and a great source of revenue to all the residents and land owners of the county.

About one-third of the county is cultivated. Total value of real estate is $1,191,460. Personal, $527,016. Educational facilities, number of public schools, amount of school fund—Fifty-nine schools; $78,-114.30. Farm animals, good. Principal towns—Lamar, population 1,500; Golden City, population 400; Milford, Leroy, Nashville and Dublin. One bank and three newspapers.

Live Stock.	Number.	Value.
Horses	4,490	$102,904
Cattle	19,886	169,686
Sheep	10,184	10,184
Hogs	13,914	14,942
Mules	1,044	31,565
Jacks	19	295

BATES COUNTY.

Organized in 1843, from parts of Cass and Vernon. The present population is about 22,480. The general surface of the county is undulating, the soil is rich and fertile and often of great depth. The principal streams are the Osage river, Maries, De Cygne, Grand river, Wal-

nut creek, Panther creek, Deer creek, Miami creek. Mineral resources —Coal in abundance. Factories, mills, etc.—Eleven flouring mills, one woolen factory, etc. Seven miles of railroad, value $44,520. The total value of real estate, including town property, cultivated and uncultivated lands, is $3,970,778. Amount of township school fund, $52,000; of county school fund, $40,437. All of the improved varieties of horses, cattle, hogs and sheep in good quantities. Bee culture—4,000 stands. The principal towns are Butler, Hudson, Papinsville, Rockville, Altona, and Johnston. The only bank in the county is the First National Bank of Bates county. There are three newspapers—Record, Times, and Democrat. Number of milk cows, 5,860.

AGRICULTURAL PRODUCTS..

Article.	No. acres.	Yield per acre.
Tobacco	460	1,800 lbs.
Corn	33,200	50 bushels.
Wheat	17,260	12 "
Rye	968	15 "
Oats	23,016	35 "
Flax	4,800	11¼ "
Timothy hay	33,560	1¼ tons.
Clover hay	680	2¼ "
Timothy seed	1,200	3 bushels.
Clover seed	375	4 "
Vineyards	50	.....
Orchards	3,320	120 bushels.

Live stock.	Number.	Value.
Horses	9,776	$817,182
Cattle	31,436	881,893
Sheep	16,440	16,440
Hogs	33,444	67,206
Mules	2,873	89,468
Jacks and Jennets	52	2,168

Forest culture or tree planting—none. Hedge fencing—Osage Orange. Land drainage—none.

BENTON COUNTY.

Organized in 1820. Present population about 18,000. One half of the county is prairie, the other half broken and timbered. The principal streams are the Osage river, Cole Camp, Sac, Deer, Buffalo, Brushy and Turkey creek. Mineral resources—Coal, iron, zinc, copper, silver, stone, brick and potters clay. There are thirteen flour, saw and grist mills in the county, and three wagon shops. Exports—Hogs, sheep, cattle, corn, wheat, oats, timber, etc. Principal towns—Warsaw, Cole Camp, and Lincoln. Newspapers—Warsaw Times (Republican), Warsaw Register (Democrat).

BOONE COUNTY.

Boone county was settled in 1815, organized in 1820, has an area of 637½ square miles—431,000 acres—and an enviable location. Situated in the very heart of the Missouri Valley, and in the fairest and richest portion of northeastern Missouri, with the Missouri river on its southern, and two great trunk railway lines upon its northern border, it combines the best commercial facilities with such advantages of climate, soil, topography, agricultural production and mineral resource as few districts in the great West can boast. Present population over 30,000.

The natural drainage of the county is well-nigh perfect. A section will cover the cold, wet, dead levels of the whole territory. Dry ravines, gulches, springs, brooks, branches and larger streams quickly carry the surplus waters of the county into the great river upon its southern border. The lacustrine deposits of the bluffs and hill districts are the most porous of soils, and never want for adequate drainage.

The timber supply is alike ample and admirable. White swamp and burr oak, white and black walnut, white and blue ash, hickory, cherry, red elm, honey locust, mulberry, sugar maple and linden of excellent quality, with other valuable commercial woods abound in every division of the county. To these varieties may be added cottonwood, willow, hawthorn, common water elm, birch, pecan, hackberry,

ironwood, buckeye, sycamore, boxelder, white maple, persimmon, red cedar, etc. Fully eighty per cent. of the county was originally covered with forest, and it is safe to say that forty-five per cent. is still wooded, the supply of timber and fuel being vastly in excess of the local needs.

Boone county has a water supply equal to any first-rate agricultural county of my knowledge. The entire southerly border of the county (40 miles) is washed by the Missouri river. The western and northern portions are drained by the Perche and Moniteau creeks, and a score of tributary streams; the central portion by the Hinkston and its branches; the northern portion by the upper waters of the Perche and Hinkston, and the eastern and southeastern portions by the Bonne Femme and Cedar, with a full half hundred feeders. Spring brooks by the dozen, and clear, never-failing rock springs by the hundred, supply three-fourths of the county with the purest water, while the prairie districts are well supplied with wells, cisterns and artificial ponds.

The mineral resources of this county are chiefly represented by lime and freestone, bituminous and cannel coals, mineral paints in several colors, a superior quality of potters clay, and valuable mineral waters. There is no end of building stone, hydraulic limestone of superior quality being found in inexhaustible beds and out-cropping ledges of the cheauteau group along the Missouri and Perche. White limestone (encrinital) of excellent quality for building uses, is found in great masses out-cropping along the Hinkston and its tributaries. The Bonne Femme and Cedar districts are abundant in limestones of good quality and ferruginous sandstone, of fine quality for building uses, is found on the lower Hinkston

Coal of good quality, from out-croppings to two hundred feet below the surface, in four distinct veins, varying in thickness from one to four feet, underlies a full half of the county, and is easily worked by "stripping," "drifting" and "shafting." The local market is supplied at one dollar and fifty cents per ton at the mines and two dollars and fifty cents per ton in the towns. Block coal, suitable for smelting purposes, is found in the central part of the county, and a thirty-inch vein of cannel coal has been found on Grindstone creek.

Potters clay is found in quality and quantity to warrant extensive manufacturing, and with cheap fuel and a broad market, should become a source of great wealth to the county.

Foremost among the resources of this rich and beautiful county are the soils, a note of which will most interest the eastern reader. The Missouri bottoms, of which there are about fifty square miles, with the valleys along the minor streams, are alluvial from four to fifteen feet in depth, of inexhaustible fertility, and admirably suited to wheat

and corn, of which half a hundred successive crops are grown without a sign of diminution in yield.

The "elm lands," of which there are at least 20,000 acres, chiefly along the divide between the Perche and Moniteau, have a chocolate colored soil from fifteen to thirty inches deep, of great richness and versatility, and produce splendid crops of everything grown in this latitude. The bluff or loess soils of the bluff districts, embrace about seventy square miles, chiefly along the Missouri and the middle and lower Perche, Hinkston, Cedar and Bonne Femme are from ten to one hundred feet in depth, loose and porous in structure, nearly identical with the world famous loess of the Rhine and Nile, and with their remarkable combination of finely cominuted silica, lime and magnesia carbonate, lime phosphate, alumina, etc., make an indestructible soil, the finest for fruits, grass, and, indeed, nearly all domestic vegetation known to husbandry. The oak soils of this county, which in their native state are chiefly remarkable for the production of white oak and hickory timber, though not so highly esteemed by the farmer as the other soils herein named, are yet finely adapted to wheat, tobacco, red clover and fruits, which they produce in great perfection, and in conjunction with a subsoil strong in siliceous and organic matter, alumina, etc., will prove in the hands of deep cultivators of great permanent productive value. These lands embrace not less than 75,000 acres of the county, and constitute the hill districts neighboring to the Perche, Hinkston and Cedar creeks. The prairie soil embraces about eighty square miles, mainly in the eastern and northern portions of the county, is rich and flexible, strong in vegetable mould, (humus) siliceous and organic matter, alumina and other valuable constituents, generally takes the chocolate or mulatto shade, is from ten to twenty inches in depth, much resembling the elm soil, both in color and productive power, and gives a splendid growth to corn, oats, field and garden vegetables and the grasses. Large districts of rolling woodland, not included in the above notes upon soils, are covered with a rich growth of oak, elm, ash, hackberry, walnut, honey locust, cherry, etc., have a soil rich in vegetable mould, silica, organic matter, lime, alumina, etc., possess many of the best characteristics of the distinctive soils named, and are clearly among the most valuable lands in the county. The subsoils of the county are generally rich in siliceous marls, are strongly marked with the loess characteristics, range from one to one hundred feet in depth, slack like quick lime on exposure to frost and atmosphere, and to the man who plows deep and cultivates thoroughly, are an inexhaustible mine of productive wealth, which some day will make Boone county, and, indeed, all north Missouri, the classic ground of American husbandry. As a whole, the soils mentioned give the widest range of pro-

duction known to modern husbandry. Every domestic product of the soil that flourishes between the northern limit of the cotton fields and the northern Red river, is at home, and reaches perfection in these soils.

Boone county has fifty miles of railroad and fifty five miles of rock road. Total acreage of the county is 429,846, exclusive of town lots. The whole number of acres not cultivated and unproductive is 85,969, which is rough and broken, and not tillable. We have 108 public district schools, white and colored; the State University, Stephens' Female College and Christian Female College; $10,150 public school fund apportioned; last district tax for school purposes, $20,834. There are 3,000 bee stands in the county. Our principal towns are Columbia, Centralia, Sturgeon, Rocheport and Ashland.

Banks—Boone County National, Exchange National, Rocheport Bank, Sturgeon Bank and Centralia Bank.

Newspapers—Statesman, Herald and Sentinel, Columbia; Centralia Guard, Sturgeon; Leader, Rocheport; Ashland Bugle, Ashland.

AGRICULTURAL PRODUCTS.

Articles.	No. acres.	Yield per acre.
Corn	49,125	30 bushel.
Wheat	34,387	14 "
Rye	3,000	15 "
Oats	5,000	20 "
Timothy hay	60,000	1 ton.
Clover hay	15,000	1½ tons.

Live stock.	Number.	Valuation.
Horses	8,042	$245,299
Cattle	17,722	240,865
Sheep	28,640	47,350
Hogs	36,890	53,995
Mules	3,721	129,400
Jacks, Jennets	101	4,990

We have several hundred miles of hedge fencing. Land drainage—none needed.

BUCHANAN COUNTY.

Organized February 10, 1839. Present population about 50,000. The face of the county and quality of soil is admirably diversified with hill, dale and highland, steep bluffs, low and gentle declivities and undulating surfaces along the north line; they are made by bottoms, rising by gentle slopes into the neighboring hills. The county is drained by the Platte river and its tributaries. The principal streams are Platte river, Black Snake, Contrary, Bee creek, Malden, and the Missouri river washes the western border for about thirty-five miles. The Missouri bottoms are flat. There is an abundance of building stone and clay for brick, with indications of coal. There is one woolen mill and steam flouring mill, besides many other mills. There are five railroads running through the county, with a total of 123 miles. About 50,000 acres are under cultivation; value, $670,000.00; about 202,000 acres not cultivated. The exports are mainly corn, wheat, tobacco, hemp, barley, rye, cattle and hogs. There are seventy-nine organized district schools without St. Joseph. The permanent school fund for the county is $68,000.00; and in St. Joseph sixteen public schools and one high school; city school fund, $63,381.62. There are 6,340 horses in the county and of good variety. Number of mules, 2,411; number of cattle, 10,909. The principal towns are St. Joseph (the county seat,) Easton, Hallock, Wallace, DeKalb, Rushville, Winthrop, Agency, Frazier and Arnoldsville. Six newspapers are published: The St. Joseph Gazette, (daily and weekly); St. Joseph Herald, (daily and weekly); Western News; St. Joseph Volksblatt, (daily and weekly); St. Joseph Commercial and the Chaplet.

AGRICULTURAL PRODUCTS.

Timothy hay, clover hay; timothy seed and clover seed very little raised. Several acres in vineyards, but number not known, with large number of orchards, and small fruits and berries in abundance.

Live Stock.	Number.	Value.
Horses	6,340	$210,190
Cattle	10,909	1,230,909
Sheep	4,202	4,540
Hogs	22,854	71,690
Mules	2,411	110,260

In forest culture or tree planting, there is very little done. There is considerable hedge fence, but amount not known.

CALDWELL COUNTY.

Organized December 26, 1836. Present population, 14,000. Among all the attractive counties of Northwest Missouri there is none more fertile and productive, more healthy or more beautiful in appearance than Caldwell. The county lies about 140 miles west of Hannibal and Quincy, and forty miles east of St. Joseph. Its nearness to the cities of Western Missouri and Eastern Kansas gives its towns strong commercial features. The face of the country and quality of soil of this county is remarkable alike for its high fertility and versatility of production. On the prairies it is a deep, dark vegetable mould, fifteen to forty inches in depth, with an open, porous subsoil that quickly absorbs moisture, and is substantially imperishable. No account is made of artificial manures here, for none are needed. There are corn fields all over Western Missouri that have been in corn for thirty, forty and fifty successive years, and give no signs of diminution in crop. Indeed, the yield grows stronger with deeper and older cultivation. In the bottoms the soil is a black, rich alluvium, three to ten feet deep, generally underlain with drift, and wonderfully productive. In the timbered highlands it is of lighter color, greater consistence and well suited to domestic grasses. The county is three-fifths prairie and two fifths timber, with gentle rolling surface. The timber supply is excellent and ample. Oak, elm, ash, walnut, sycamore, sugar and white maple, hickory, box elder, pecan, linden, coffee bean, hackberry cottonwood and other varieties, peculiar to this latitude, abound in the bottoms and hills along the streams, the white and burr oak and walnut furnishing a full supply of lumber and timber for local building uses. Cord-wood sells in the local markets for $1.50 to $2.00 per cord. The streams, of which Shoal creek is the principal, running through the center of the county from east to west, and Log, Long, Mud, Brushy, Goose, Mill and Cottonwood creeks, with nameless small runs, are the minor ones, are well distributed over the county, and furnish not only a permanent and ample supply of water for all domestic uses, but give an ample and well distributed supply of timber to all portions of the county. They are deep set and generally clear, rapid streams, born of, and getting their main impulse from the cold rock springs in the near ledges and wooded hills. The wells, which are from twelve to fifty feet in depth, furnish a good supply of pure water. Shoal creek gives sufficient water power for the local demand. There are surface indica-

tions of coal but no effort has been made to develop. The coal measures of the county underlie a large portion of its surface in sixteen to twenty-four inch veins, near enough to the surface to be easily and cheaply worked, and with a moderate capital could be made a source of large revenue. Little effort has been made, as yet, for either their exploration or development. Limestone, abundant in quantity and of the very best quality for building purposes, is found in many portions of the county. Its clean stratification, from two inches to three feet in thickness, makes it available for all uses, from elegant flagging to heavy dimension stone, and while it is worked for shipment to many points along the Hannibal and St. Joseph Railroad, it is so easily and cheaply quarried that it is likely to become a source of great future and permanent wealth of the county. Factories, mills, etc.—One cheese factory, one furniture factory and six steam flouring mills. The Hannibal and St. Joseph Railroad has 28 80-100 miles in the county. Number of acres cultivated, 163,500, valued at $1,553,250.00. Number of acres not cultivated, 108,932. Exports, 9,600 cattle, 24,460 hogs, 83,000 bushels corn, 53,900 bushels oats and 20,800 bushels wheat. There are seventy public school buildings, four of which are graded schools, two buildings costing $15,000.00 each, one $10,000.00; school fund, $57,000.00. Farm animals—Horses, mules, cattle, sheep and hogs. Quality of stock good, and being improved; four herds of thoroughbred cattle. Bee culture—About 1,200 stands. The principal towns are Hamilton, (population 1,200); Breckenridge, (population 1,000); Kingston, (population 650). Banks—Exchange Bank, Breckenridge, Houston and Spratt, Hamilton, and Hamilton Savings Bank. Newspapers—News Graphic, Hamiltonia, Hamilton; Bulletin, Breckenridge; Sentinel, Kingston. Dairy product, 280,000 pounds butter.

AGRICULTURAL PRODUCTS.

Articles.	No. Acres.	Yield per Acre.
Tobacco, very little raised		
Corn	81,750	50 bushels.
Wheat	6,500	7 "
Rye	500	50 "
Oats	25,600	35 "
Flax	1,500	10 "
Timothy hay, light this year	51,720	1½ tons.
Clover hay	5,200	2 "
Timothy seed		2½ bushels.
Clover seed		4 "
Vineyards	50	
Orchards	1,500	
Small fruits and berries	100	

Live Stock.	Number.	Value.
Horses	7,345	$246,825
Cattle	23,580	295,455
Sheep	23,857	28,990
Hogs	34,512	74,020
Mules	1,256	49,700
Jacks	42	1,470

Forest culture or tree planting, very little done. We have about 1,750 miles of hedge fencing in the county.

CARROLL COUNTY.

Organized January 3, 1833, from part of Ray county. Present population—census of 1875—21,518. Face of the county and quality of soil—South of the Missouri river good, and very productive bottom and prairie, except skirting on river; uplands rolling, rich and productive. Principal productions are corn, wheat, oats, rye and tobacco. Principal streams—Missouri on south, and Grand river on east; in the interior, Wakanda, Big, Moss, Turkey, Hurricane, and numerous smaller streams. Mineral resources—Coal in abundance, white and yellow quarries inexhaustable; indications of lead on Big creek in north part of county. Factories, mills, etc., are Wild Moss, City, Queen, Drake, Morton, Baum, Dewitt and Phlega mills that manufacture; three or four smaller mills, and eleven saw mills, principally steam. Railroads, rock and gravel roads (number of miles of each)—One mile macadamized from Carrollton to depot; St. L., K. C. & N. R. R. runs east and west through the county 26½ miles. Number of acres cultivated about 8-10. Number of acres not cultivated about 2-10. Exports are horses, mules, cattle, hogs, sheep, grain, fruit and stone. Educational facilities, number of public schools, amount of school fund—Good; 116 districts, each have good schools; graded school in Carrollton with 13 teachers and about 700 pupils. Farm animals, variety of breeds and amount of work stock—Norman, and few imported roadsters and common horses; cattle, Durham and common. Bee culture, number of stands—1,500 to 2,000. Principal towns are Carrollton, county seat, Norborne and Dewitt, all on railroad. Banks—Exchange and Wilcoxsen, & Co., both at Carrollton. Newspapers—

Democrat, Journal and Record in Carrollton, Independent at Norbornne, Triple Link, published at Democrat office. Dairy product—Every farmer keeps his own dairy.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	1,000	1.000 lbs.
Corn	150,000	8 barrels.
Wheat	30,000	15 bushels.
Rye	1,000	12 "
Oats	15,000	30 "
Flax	2,000	8 "
Hemp	100	800 lbs.
Timothy hay	100,000	1½ ton.
Clover hay / Timothy seed	50,000	
Vineyards	30	
Orchards	1,200	
Small fruits and berries	15	

LIVE STOCK.

Number of horses, 9,872; cattle, 29,198; sheep, 14,161; hogs, 67,262; mules, 3,697; jacks and jennets, 42. Forest culture or tree planting—None; have natural growth. Hedge fencing, kind, and number of miles—A great deal of hedge, but cannot tell how much.

CARTER COUNTY.

Organized in 1859. Present population is 1,800. Face of the county and quality of soil—Broken; bottoms are rich and well adapted to grain growing; valleys are fertile and rolling, and are well adapted to grapes, fruit and grass growing. Principal streams—Current river is the largest, Little Black river, Pike creek, Big Barren, Brush, Henpeck, etc. Mineral resources—Splendid specimens of iron, zinc, lead and copper, but as yet none are successfully developed. Factories, mills, etc.—No factories, four lumber and three grist mills. Number of acres cultivated and value—17,554, valued at $87,770. Number of acres not cultivated, 296,424. Exports—Lumber, wheat,

hogs, cattle and sheep. Educational facilities and number of public schools—Rather poor; ten public schools; school fund, $700. Farm animals, variety of breeds and amount of work stock—Horses and mules; Black Hawk, Grey Eagle and Gold Dust. Bee culture—number of stands, 300. Principal towns—Van Buren and Colemanville. Newspapers—Van Buren Times. Number of milk cows is 600.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	20	2,000 lbs.
Corn	11,000	35 bushels.
Wheat	5,000	10 "
Oats	1,000	15 "
Timothy hay	250	1 ton.
Clover hay	275	1½ tons.
Vineyards	5	
Orchards	300	
Small fruits and berries—Small amount		

Live Stock.	Number.	Value.
Horses	577	$15,691
Cattle	1,686	12,160
Sheep	1,277	1,277
Hogs	5,027	4,998
Mules	197	6,965
Jacks	7	375
Jennets	6	180

CASS COUNTY.

Organized in 1835. Present population, about 20,000. Face of the country—Rolling prairie, timber skirting the streams. The principal streams are Grand river, Big creek and Camp Branch creek. There are one woolen and ten grist mills in the county, and 63 miles of railroad. About 250,000 acres are under cultivation and 20,000 acres are not cultivated. The number of public schools is 110, and the school fund amounts to $89,968. The principal farm animals are mules and horses. Principal towns—Harrisonville, Pleasant Hill, Ballou, East Lynn, Freeman and Austin. There are three banks and two newspapers.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Corn		50 bushels.
Wheat		25 "
Oats		50 "
Timothy hay		3 tons.

Live stock.	Number.	Valuation.
Horses	9,351	$286,408
Cattle	30,892	327,646
Sheep	15,118	18,088
Hogs	52,386	85,414
Mules	2,745	82,224
Jacks and Jennets	40	1,191

CEDAR COUNTY.

This county was organized February 14, 1845. Present population estimated at 15,000. The county is somewhat hilly and broken, and the soil varies; river and creek bottoms are black loam. The upland timber and prairie is mostly known here as mulatto soil. The Sac river passes through the county from south to north, and with Bear, Cedar, Horse, and the Alder creeks, furnishes abundant water. The mineral resources are perhaps good, but have only been developed in a small way. The county has a woolen factory and nine saw and grist mills; railroads none, only in prospect. There are 301,477 acres, valued at $803,529, and about one-fourth of the above number of acres are in cultivation. Exports amount to $200,000. The number of public schools is seventy-three, and the school fund amounts to $33,000. Bee-stands, 3,000. There are no banks in the county, but several persons loan money and shave notes. Newspapers—Stockton Journal (Democrat), Stockton Stalwart (Republican).

Agricultural Products.

Corn, 30 bushels per acre; wheat, 18 bushels per acre; rye, 20 bushels per acre; oats, 38 to 40 bushels per acre; flax, 10 bushels per acre; timothy hay, 1 ton per acre; orchards, 250 bushels per acre.

Live stock.	Number.	Valuation.
Horses	4,665	$115,844
Cattle	17,118	134,656
Sheep	13,189	13,189
Hogs	27,358	28,949
Mules	1,161	35,778
Jacks and Jennets	27	1,003

Land drainage, very little.

CLARK COUNTY.

Organized December 16, 1830. Present population, 18,000. Face of the country and quality of soil—Upland, rolling, half prairie and half timber, black surface with clay subsoil; bottoms level, soil sandy loam. Principal streams—Des Moine on the north, Mississippi on the east; Fox river and Wyconda runs through the county, flowing in a southeast direction; Honey creek and Sugar creek have their sources in the county. Mineral resources—One coal bank, and specimens of iron ore and other minerals are found in different parts of the county. There are carding mills at Clark City, flouring and grist mills at Kahoka, Winchester and Alexandria, ten in all. There are two railroads in the county—one twenty-eight miles long, the other ten; there are no gravel or rock roads. Cultivated lands—there are 161,280 acres, worth twelve dollars per acre. Uncultivated—there are 161,280 acres, worth eight dollars per acre. Exports—Wheat, oats, corn, rye, hay, potatoes, apples, hogs, cattle, sheep, horses and mules. Amount of school fund $10,000; number of schools, eighty-five. Farm animals—Of horses, there are the Norman, Morgan, Iron Duke, Gray Eagle; of cattle, there are several Shorthorn varieties, the red and roan Durhams and Devons. Bees—This line of business is attracting attention; whole number of stands, 5,000. The principal towns are Kahoka, Alexandria, Luray, Fairmount, Winchester, St. Francisville and Athens.

Banks—Savings bank at Kahoka; William McDermont, cashier. There are three newspapers in the county—The Democrat and Gazette at Kahoka, and Commercial at Alexandria; the first two are Democratic in politics, and the other Republican.

Dairy products—Cheese, 2,000 pounds; butter, 45,000 pounds; num- of cows in the county, 9,000 head.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	10	100 to 800lbs
Corn	107,520	30 to 80 bus.
Wheat	3,000	10 to 30 "
Rye	1,000	10 to 30 "
Oats	10,000	30 to 40 "
Barley		
Flax		
Hemp		
Timothy hay	7,635	1 to 3 tons.
Clover hay	2,000	1 to 2 tons.
Timothy seed	100	4 to 6 bus.
Clover seed		
Vineyards	25	5 to 7 bbls.
Orchards	80,000	10 to 500 b.
Small fruits and berries	100	10 to 20 gal.

Live stock.	Number.	Valuation.
Horses	9,000	$35 per head
Cattle	20,000	20 "
Sheep	6,000	2 "
Hogs	10,000	2 "
Mules	2,500	40 "
Jacks	5	100 "
Jennets	20	20 "

Forest culture and tree planting, none. Hedge fencing—There are 40 miles of osage orange. Land drainage—Results good, but very little done.

CLAY COUNTY.

Organized in the year 1822. Present population, 15,320. Face of the country and quality of soil—Surface somewhat broken, soil very fertile and well watered; a good supply of timber, interspersed with

small and fertile prairies. Principal streams—Missouri river on the south and southeast; Fishing river and its tributaries through the north and east; tributaries of Platte river in northwest; Big Shoal and Little Shoal running through the central part of the county, with various other small streams. Mineral resources—Stone coal near Missouri City; a small quantity of mineral lead ore has been found near Liberty Landing. Factories, mills, etc.—There are three woolen, ten or twelve steam saw and grist mills in the county. Clay county has fifty-eight miles of railroad; no rock or gravel roads. Total number of acres in the county, 255,160 83-100. We have no means of knowing the number of acres not cultivated. Corn, wheat, oats, hemp, tobacco, fruits, wine, horses, mules, poultry, butter and cheese, cattle sheep and hogs, are the principal exports. We have one college (William Jewell) and three seminaries for girls, and sixty-six public schools in the county. Farm animals—Hamiltonians, Clydesdale and Morgans are the principal stock of horses, and the Short-horns and most of the thoroughbreds. We have no means of ascertaining the number of bee-stands in the county, but a few persons give their entire attention to bee culture, yet nearly every farmer has one or more stands. The principal towns are Liberty (county seat), Missouri City, Kearney, Smithville, Holt, Harlem, Barry, Pratherville, Greenville and Gosneyville. Banks—Two in Liberty and one in Missouri City. Newspapers—Liberty Tribune and Liberty Advance, both weekly, and both Democratic in politics. We have but one dairy of about forty cows.

Agricultural Products.

Article.	Yield per acre.
Tobacco, 268,966 pounds raised	1,000 lbs.
Corn, 197,543 bushels	40 bus.
Wheat, 222,416 bushels	18 "
Rye, 42,791 bushels	20 "
Oats, 35,868 bushels	35 "
Barley, but little raised.	
Flax, only for family use.	
Hemp, 1,079 tons	900 lbs. ave
Timothy hay, no means of knowing	1½ to 2 tons
Clover hay, no means of knowing	3 to 5 tons
Timothy seed, no means of knowing.	
Clover seed, no means of knowing;	
Vineyards, 8,320 gallons wine, at 50 cents.	
Orchards, every farmer has one.	
Small fruits and berries raised in limited quantities.	

Live stock.	Number.	Valuation.
Horses	5,916	$166,445
Cattle	15,635	281,942
Sheep	17,735	19,471
Hogs	45,861	55,173
Mules	2,338	74,440
Jacks and Jennets	47	2,423

Forest culture or tree planting—None. Hedge fencing has been used in this county for several years. Land drainage—None, or very little.

CLINTON COUNTY.

Clinton county was organized in 1834. The present population is about 17,481. The face of the country is rolling, and the soil a rich, black and clay loam. Principal streams—Castile, Smith's Fork of Platte river, Shoal creek, Crooked river and Fishing river. Mineral resources undeveloped. There are about fifteen factories, mills, etc. Railroads, 104 miles; graded roads, 800 or 1,000 miles; no pike. 240,000 acres are cultivated, and valued at $2,640,000; number of acres not cultivated, 24,640. Exports—Fruit, grain, and live stock. The educational facilities are good, the number of public schools is seventy, and the amount of the school fund, $38,000. Bee-stands, 2,000. The principal towns are Plattsburg, Cameron, Lathrop and Gower. The county has five banks and five newspapers. The number of milk cows about 7,900.

Agricultural Products.

Article.	No. acres.	Yield per acre.
Tobacco	800	1,800 lbs.
Corn	120,000	50 bushels
Wheat	20,000	15 "
Oats	20,000	40 "
Timothy hay	15,000	2 tons
Orchards	25,000	....

Live stock.	Number.	Value.
Horses	7,100	$227,000
Cattle	24,000	288,000
Sheep	17,000	26,000
Hogs	52,000	80,000
Mules	20,000	80,000
Jacks	20	4,000

There are 1,600 miles of osage orange hedges.

COLE COUNTY.

Organized in 1820. Present population, about 12,000. The face of the country is uneven,but the quality of the soil is excellent for fruit and small grains, especially winter wheat, its drainage being perfect. No prairie, but very fine timber, and well watered. The principal streams are Osage, Moreau and Moniteau. Mineral resources—Coal, lead, iron, limestone rock of fine character, for lime and building purposes, and clay for bricks. Mostly upland. One large iron factory and about twenty grist mills. The Pacific railroad traverses the county for about twenty-two miles, and twenty-one miles of the Missouri Central are under course of construction; there are about four miles of gravel road. The county contains 234,466 acres. Exports—Wheat, corn, apples, peaches, potatoes, poultry, oats, barley, cooper stuff, brick, lime, threshing machines and reapers. Farm animals—Horses, mules and oxen of the ordinary breed, and also of approved breeds. About 250 stands of bees. The principal towns are Jefferson City, Osage City, Centertown, Elston, Taos and Hickory Hill. Banks—First National, Exchange, and Fleming & Sears. Newspapers — Tribune, Journal, Eclipse, and two German weeklies.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco, very little now, formerly		800 lbs.
Corn		35 bushels.
Wheat	2,660	15 "
Rye	300	20 "
Oats		30 "
Barley		25 "
Flax		7 "
Timothy hay		1½ tons.
Clover hay		1 ton.
Clover seed		4 bushels.
Vineyards	200	
Orchards	2,800	250 bushels.
Small fruits and berries	100	

Live stock.	Number.	Value.
Horses	5,000	$150,000
Cattle	10,000	100,000
Sheep	5,000	10,000
Hogs	20,000	80,000
Mules	4,000	120,000
Jacks	10	
Jennets	20	

Forest culture or tree planting—Very little, except fruit trees. Hedge fencing—Osage orange is planted here in a limited way. Land drainage—Nothing of consequence done in this direction.

COOPER COUNTY.

Organized in 1830. Present population estimated at 25,000. Face of the country and quality of the soil—Fifty per cent. forest; bottom land, sixteen and two-third per cent.; prairie, thirty-three and a third per cent; the soil is very fertile. Principal streams are Lamine, Blackwater, Flat creek, Shipt creek, Petite Saline and Moniteau creek. Mineral resources—Coal in abundance, lead and iron in heavy deposits in the western portion of the county. Factories, mills, etc—One woolen factory, one foundry, one furnace, and fifteen flouring mills and one furniture factory. Railroads, rock and gravel roads, number miles

of each—M., K. & T., twenty-four miles; O. V. P., twenty-four miles; Pacific, six miles. Number of acres cultivated and value—266,378 acres, valued at fifteen dollars per acre, or $3,995,685. Number of acres not cultivated, 88,793. Exports are mules, horses, cattle, hogs, wheat, corn, oats, flour, tobacco, wine, stoneware and woolen goods. Educational facilities—85 schools; principal of various school funds, $45,337.01; our district school tax averages $2,500.00 annually; we have ten high schools. Farm animals—Mules and horses. Bee culture, number of stands—Great many stands. Principal towns are Boonville, Otterville, Bunceton, Pilot Grove, Pleasant Green and New Palestine. Banks—Central National Bank of Boonville, Exchange Bank of Achle, Lee & Dunnica, Boonville. Newspapers—The Advertiser, Topic and Central Missourian. Dairy products, and number of milk cows—Two cheese factories; number of cows not known.

AGRICULTURAL PRODUCTS AND YIELD PER ACRE.

Corn, 50 bushels; wheat, 15 bushels; rye, 12 bushels; oats, 30 bushels; timothy hay, large amount raised; vineyards, great many in northern part of county; orchards, nearly every farmer has one.

Live stock.	Number.	Value.
Horses	7,251	$220,760
Cattle	19,786	241,988
Sheep	20,461	24,749
Hogs	45,688	88,496
Mules	3,381	137,545
Jacks	85	3,765

Hedge fencing—Osage orange extensively used.

DADE COUNTY.

Organized in 1841. Present population, about 12,000. Face of country and quality of soil—About one-half prairie, and the other half timber; the prairie lands are rolling and rich and are easily cultivated. Principal streams are Big Sac, Turnback, Horse and Muddy creeks, and a great many fine springs. Mineral resources—Coal, iron,

lead and copper. Factories, mills, etc.—Six water and one steam mill. Farm animals—Horses and mules. Bee culture, number of stands—1,500 to 2,000. Principal towns—Greenfield and Dadeville. Banks—One. Newspapers—Two. Dairy products and number of milk cows—About 5,000 cows; not much attention paid to dairying.

AGRICULTURAL PRODUCTS AND YIELD PER ACRE.

Tobacco, small scale, but quality good; corn, principal crop raised; wheat, good, yields from 10 to 30 bushels per acre; rye, not much raised; oats, 40 bushels per acre; barley, none raised; flax raised to some extent for seed; no hemp raised; timothy hay, half crop raised this year; vineyards do well; orchards, extensively raised; small fruits and berries do well.

Live Stock.	Number.	Value.
Horses	5,206	$154,840
Cattle	16,273	147,856
Sheep	9,753	9,753
Hogs	38,482	54,141
Mules	1,498	57,499
Jacks	37	1,605

Forest culture or tree planting—Not much done. Hedge fencing—Osage orange used and a great deal of it. Land drainage—None needed.

DALLAS COUNTY.

Organized about 1842 by the name of Nagara; in 1844 changed to Dallas. Present population, about 10,000. The face and soil of the county is about one-third gentle rolling prairie, about one-third a barren of red loamy soil, one-third broken along the Niangua river. The principal streams are the big and little Niangua, Pomme de Terre Greasy and Lindley. Mineral—Considerable lead has been found in portions of the county; the Rambo Mines have been worked with success. There are three steam flouring mills, one steam saw mill, and eight water mills in the county. There are no railroads, or rock and gravel roads in

the county. There are 86,400 acres cultivated lands; uncultivated, 239,832. There are sixty-five public schools in the county. Farm animals—Horses, mules and oxen. Bee culture is a success. The principal towns are Buffalo, Webana, Louisberg and Long Lane. Banks—None. There are two newspapers in the county—the Buffalo Reflex, and Buffalo Register. There are 4,000 milk cows in the county.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	40,000	
Corn		40 to 80 bus.
Wheat	20,000	10 to 20 "
Rye		
Oats	20,000	20 to 40 "
Barley		
Flax		
Hemp		
Timothy hay	1,000	3 tons.
Clover hay		
Timothy seed		
Clover seed		
Vineyards		
Orchards	500	
Small fruits and berries		

Live Stock.	Number.	Value.
Horses	3,722	$102,043
Cattle	10,855	83,489
Sheep	12,086	12,094
Hogs	13,602	18,608
Mules	1,100	33,752
Jacks	27	537

DAVIESS COUNTY.

Organized December 29, 1836. Present population, about 17,000. The face of the county is generally rolling, soil a good sandy loam. Grand river and its branches, Grindstone, Big Muddy, Marrowbour,

big creek and Honey creek are the principal streams. There is plenty of good building stone in the county. There are five flouring mills, any number of saw mills, two wagon and two ax-handle factories. There are sixty-five or seventy miles of railroad in the county. There are 184,320 acres of cultivated land, valued at $2,00,000; uncultivated, 184,320 acres. Exports—12,000 to 15,000 car loads of stock and produce are shipped yearly. School fund, $65,000; public schools, 107. Farm animals—4,000 horses, 800 mules, and a few oxen worked. Bees, 6,000 stands, have done but little good this year. The principal towns are Gallatin, Jamesport, Jameson, Pattonsburg, Winston. There are three banks—the Daviess County Savings Bank, Farmers Exchange, Gallatin; Farmers Bank, Jamesport. Newspapers—North Missourian and Democrat at Gallatin; Gazette, Jamesport. No dairies in this county; about 6,000 cows.

AGRICULTURAL PRODUCTS..

Article.	No. acres.	Yield per acre.
Tobacco, none this year		
Corn	81,440	45 bushels.
Wheat	15,360	10 "
Rye	2,500	10 "
Oats	12,000	35 "
Barley, non		
Flax	1,000	6 "
Hemp, none		
Timothy hay	34,864	1 ton.
Clover hay	1,000	1 "
Timothy seed	1,500	8 bushels.
Clover seed	300	2 "
Vineyards	100	4,000 lbs.
Orchards	3,200	50 bushels.
Small fruits and berries	20	20 "

Live stock.	Number.	Value.
Horses	7,906	$318,066
Cattle	28,589	330,560
Sheep	25,703	25,703
Hogs	58,291	85,981
Mules	1,716	55,813
Jacks and Jennets	53	2,211

Forest and tree planting—Not much forest planting, but two good nurseries of fruit and forest trees. Hedge fencing—About 50 miles of osage orange. Land drainage—But little done.

DeKALB COUNTY.

DeKalb county was organized in 1845, and contains 263,608 acres of as fine land as can be found in any county. The surface of the county is undulating, and diversified by prairie and woodland. The county is watered by Big Third Fork, Little Third Fork, Castile, Grindstone and Lost creeks, and numerous smaller streams, all of which are bordered by a fine growth of oak, walnut, hickory, elm, soft maple, cottonwood and ash, about one-half of the land being well timbered.

The soil is a dark loam, and the creek bottoms especially are very rich. There is no portion of the land that will not yield a good return for the labor bestowed upon it. The wagon roads are generally excellent, and the water courses are spanned by good substantial bridges.

The population of this county in 1850 was 2,075; in 1860, 5,224; in 1870, 9,858, of whom 9,756 were white and 122 colored, 5,277 male and 4,581 female; 9,255 native (5,022 born in Missouri), and 603 foreign. Since the last census the population has largely increased, being, in 1876, 11,159.

The Hannibal and St. Joseph railroad runs through the extreme southern border of the county, and the Chicago and Rock Island has about five miles of track in the southwestern corner, and the St. Joseph and Des Moines runs through the northwest corner, thus affording convenient market facilities to all parts of the county within a reasonable distance, with the advantage of competing lines.

Several quarries of good building stone have been opened, and the entire county is underlaid with coal, which some day will be opened up in abundance.

DeKalb county is substantially out of debt, and taxes are light. Taxes for all purposes are $1.40 on the $100. Improved farms are worth, on an average, about $25 an acre; unimproved lands from $5 to 8, and good timber land from $10 to $14. The county line lies only a dozen miles east of St. Joseph and the Missouri river, has an area of 430 square miles, 74 public schools, a liberal school fund, and an enrollment of about 4,000 children. The county is admirably supplied with water, timber and stone, has a mean elevation of 975 feet of rich, deep alluvial soil, and is one of the heavy stock counties, a large interest being taken both in breeding and feeding. The reports give about 6,000 horses, 1,350 mules, 20,200 cattle, 12,400 sheep and 12,500 swine. The Hannibal and St. Joseph, Rock Island, and the new narrow guage from St.

Joseph northward, all penetrate this county. The county has a valuation of nearly $4,000,000, and owes not a single dollar. Lands are selling all the way from $3.50 to $18 per acre, wild and improved, and the opportunities for purchase are numerous.

DeKalb county has twenty-four churches, of which eight are Methodist, six Baptist and six Christian. There are four Masonic lodges, three Odd Fellow lodges, six Temperance societies and nine Granges. Many of the farmers in the county are making the mistake of trying to farm too much land. There are a great many estates of 500, 800 or 1,000 acres that should be subdivided and put into the hands of thorough cultivators.

FRANKLIN COUNTY.

Franklin county was the tenth county formed in the State, and was organized in 1821. Total population, as per U. S. census, 30,098. Face of the country and quality of soil—Good in the north part, all along the Missouri river; in the center, more level, and in the south and west, somewhat rocky; the southern portion abounds in mineral of various kinds, mostly lead. The northern portion is washed from west to east by the Missouri river; the bottoms and bluffs are very fine lands; bluff lands somewhat broken; then comes a second class of uplands not quite so good, but fair farming lands; then the Bourboise lands, of which the bottoms are fine; and, then the flat lands between the Bourboise and Meramec rivers, which are somewhat diversified in soil and character; our railroad runs between the two rivers, taking the dividing ridge for its track; fine lands on Meramec bottoms, and much timber; the famous old Vamin lode is on the river, both sides, and many other diggings. By reference to Prof. G. C. Swallow's Geological Report of the mineral lands of Wm. T. Christy & Co., you will have more knowledge of the matter than I can give you; all we want here is money and men, and we can do as well as any place; good health in general. We need some more good mills; plenty of water privileges.

Principal streams—Meramec and Bourboise rivers, St. Johns, Bourboise, and Boluff creeks, Labadie Tavern and Reeds creeks; on south side of the Meramec are Indian creeks and Little Meramec, Calvy and others. Mineral resources—Lead mining has been carried on for fifty years in the county, some very successfully; we have several lead furnaces; iron in abundance; we have only one iron furnace at present.

There are about fifteen flouring mills in the county. Railroads and rock roads—We have 73 miles of railroad, and 35 miles of rock road. Total number of acres in the county, 536,000; about one-third in cultivation, one-third not susceptible of cultivation, and one-third yet to be put in cultivation. There are 107 public schools; amount of school fund loaned out, $56,460. Farm animals—No means at hand to tell. Principal towns—Washington, Pacific, New Haven, Union, St. Clair, Moselle and Sullivan. Banks—One. Newspapers—Five. There are no dairies in the county.

Agricultural Products.

Tobacco, in limited quantities; Corn, plenty; wheat and oats are raised in large quantities; there are a great many vineyards in the county; there are quite a number of orchards; small fruits and berries are cultivated, but to what extent is not known.

Live stock.	Number.	Valuation.
Horses	6,241	$171,8[illegible]
Cattle	19,705	143,6[illegible]
Sheep	12,571	12,7[illegible]
Hogs	43,828	57,7[illegible]
Mules	3,076	104,8[illegible]
Jacks and Jennets	44	1,1[illegible]

Forest culture—None, no need of it. Hedge fencing—Very small amount of osage orange. Land drainage—Only by the plow, as far as known.

GASCONADE COUNTY.

Organized in the year 1820. Present population, about 13,000. Face of the county and quality of soil—Broken; all kinds of soil. The principal streams are the Missouri, Gasconade and Bourboise rivers. The mineral resources are undeveloped. Factories, mills, etc., are one hub factory, and one flouring mill with six run of burs. Railroad, rock and gravel roads, number of miles of each—Of railroads, 16.28 miles; rock and gravel roads, 4 miles. Number of acres cultivated, and value—63,701 acres, valued at $10 per acre. Number of acres not

cultivated, fully 259,000 acres. Exports—Wheat, flour, pork, beef, hides, etc. Educational facilities—52 schools; facilities good; amount of school fund is $20,307.49. The farm stock is very common. Bee culture—100 stands. The principal towns are Hermann, (county seat), and Morrison. Banks—Hermann Savings banks. Newspapers—Advertiser, Courier, Independent and Hermann Volksblatt.

AGRICULTURAL PRODUCTS AND YIELD PER ACRE.

Tobacco, none for market; corn, 50 bushels; wheat, 20 bushels; rye, 18 bushels; oats, 30 bushels; barley, 60 bushels; timothy hay, 2 tons; clover hay, 5 tons.

Live stock.	Number.	Value.
Horses	3,089	$92,663
Cattle	12,151	82,384
Sheep	9,413	7,243
Hogs	19,097	24,637
Mules	2,020	75,886
Jacks	25	712

Hedge fencing—About ten miles of osage orange.

GENTRY COUNTY.

Organized by the Legislature in the winter of 1844 and 1845. Gentry county is a part of the famous and beautiful "Grand River Country," adjoining the "Platte Purchase," and on its eastern boundary, and is equal if not superior to the latter in fertility of soil, smoothness of surface, abundance of water and timber, and in all the other essentials that constitute the "make up" of a rich and prosperous country.

LOCATION.

This county is bounded on the west by Nodaway, on the east by Harrison, on the south by DeKalb, and on the north by Worth counties; it is only 12 miles south from Iowa line, and 30 miles northeast from St. Joseph, and is at the center of the richest corn, cattle and hog producing country in the United States. The county is 24 miles long by

20½ wide, and has an area of 322,880 acres; all available for farming purposes and nearly all susceptible of cultivation. *There is no waste land in the county.*

Population of the county is over 15,000, and is composed of as orderly, thrifty, quiet and law-abiding a set of people as live in the older States.

The face of the country is undulating, sufficient to afford good natural drainage, and is divided up into beautiful prairies, lying between the three forks of Grand river, which traverse the county a few miles distant from each other, bordering the prairies with belts of oak, walnut and other timber valuable for farming purposes, while the prairies are dotted over in every direction with groves of timber, which seem to have been designed by nature to adorn the home of the settler and to afford shelter for his domestic animals. The river bottoms are wide and high, generally above overflow, and the county is especially favored with a large proportion of this class of the most valuable of farming land.

The soil is a dark alluvial of a surprising depth, even on the highest prairies, as is everywhere amply shown by the luxuriant growth of corn, wheat and grass; and the river bottoms differ in this respect from the prairies only in the soil being of much greater depth; the subsoil is wonderfully capable of withstanding both drouth and excess of moisture equally well; in the latter case it absorbs water like a sponge, and retains a sufficiency to withstand all demands that may be made upon it during a spell of dry weather.

The principal streams are the three forks of Grand river and their tributaries, Island Branch, Long Branch, Big Muddy and others. Coal undoubtedly lies under a considerable portion of the county, at no great depth, though not yet developed; there are also indications of lead. Factories and mills, etc.—Woolen mills, flouring and saw mills. Railroads, rock and gravel roads, number miles of each—St. Joseph and Des Moine R. R., running to Albany, 20 miles in the county; St. Louis, Kansas City & Northern, running through the center of the county 25 miles. Number of acres cultivated, 94,000 acres, and valued at $940,000. Number of acres not cultivated, 213,000. Exports—40,000 hogs, 12,000 cattle, 25,000 sheep, 200,000 pounds of wool, 1,500 horses and 800 mules. Educational facilities—80 school houses; amount of school fund, $76,668, and rapidly increasing. Farm animals—No estimate. The principal towns are Albany, Gentryville, Darlington, New Town and Junction of R. R., and King City. Banks—Gentry County Bank and Bank of Albany, both at Albany. Newspapers—Albany Ledger, Temperance organ, American Freeman, Local Greenbacker. The number of milk cows is probably 10,000.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	50,000	
Corn	60,000	50 bushel.
Wheat	8,400	15 "
Rye	1,500	15 "
Oats	10,000	30 "
Timothy hay	10,000	1½ tons.
Clover hay		2 tons.
Orchards	2,000	

Live stock.	Number.	Value.
Horses	10,200	$510,000
Cattle	40,000	800,000
Sheep	40,000	80,000
Hogs	55,000	110,000
Mules	1,800	108,000
Jacks	40	

Forest culture and tree planting—Abundance of natural growth of timber in county. Hedge fencing—A great quantity of osage orange. No land drainage.

GREENE COUNTY.

Organized in 1833. Present population, 24,723. Face and quality of soil—Undulating; western and southwestern is beautiful rich prairie land; the eastern and northeastern portions are heavily timbered lands, with a rich red clay soil. Principal streams—Pickerd and Wilson creeks, Sac river, James Fork of White river. Mineral—Galena, lead and zinc ores. Factories and mills—One cotton, one woolen, and one wagon factory; one iron works, fifteen flouring mills run by water, and six by steam power. There are two railroads that pass through the county—The St. Louis and San Francisco railroad, 29.03 miles, and the Springfield and Western railroad, 20 miles. Total acreage of the county, 426,725; valuation of lands and town lots, $3,210,525. There are 226,725

acres not cultivated. Exports—500,000 bushels of wheat. School fund, receipts from all sources for the school year ending 1879, $48,566,80; average salary of teachers, $34,36. Bees, 7,000 stands ; not profitable. Principal towns—Springfield, North Springfield. Banks—Greene County National Bank, First National Bank, C. B. Holland & Sons, Private Bank.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	137	1,100 lbs
Corn, 1,243,914 bushel		
Wheat, 550,000 bushels	50,000	11 bus.
Rye, 3,808 bushels		
Oats, 73,833 bushels		

Live stock.	Number.	Valuation.
Horses	7,094	$216,961
Cattle	14,475	128,633
Sheep	16,859	16,915
Hogs	38,054	48,849
Mules	2,545	86,982
Jacks and Jennets	54	2,297

GRUNDY COUNTY.

Organized in 1840. Present population, 16,000. Face and quality of soil—Rolling prairie, interspersed with plenty of timber; soil, rich limestone ; good quality. Principal streams—Beginning on the west, are Hickory, Sugar and Wolf creeks; west of Grand river, Muddy and Honey creeks. Mineral—Coal. Factories and mills—One factory and five flouring mills. We have 27¼ miles of railroad. There are 250,000 acres of land in the county, valued at $15 per acre. We have 150,000 acres of uncultivated lands. There are about 80 public schools in the county, graded school at Trenton, and Grand River College at Edinburg.

Farm animals—5,797 horses, generally of good breeds. Principal towns —Trenton, (the county seat), Edinburg, Linley, Specardville, and Lindal. Two banks. Four newspapers.

AGRICULTURAL PRODUCTS.

Article.	Yield per acre.
Corn	40 bus.
Wheat	15 "
Rye	25 "
Oats	40 "
Timothy hay	2 tons.
Clover hay	2 to 3 "
Timothy seed	3 bus.
Clover seed	4 "

Live stock.	Number.	Valuation.
Horses	5,797	$40 per head
Cattle	18,162	.....
Sheep	19,035	.....
Hogs	46,248	.....
Mules	987	.....

Forest and tree planting—Not needed. Hedge fencing—Osage orange; number of miles not known.

HARRISON COUNTY.

Harrison county in the State of Missouri, is twenty-four miles wide, east and west, and little over thirty miles long, north and south. It joins the Iowa line on the north, and is in the fourth tier of counties east of the Missouri river. The county contains about 465,000 acres of land. From the best information we have been able to gather, in the short time allotted to us, we are led to believe that about one-half the land of the county is enclosed, but that no more than one-third of the county

is in cultivation. A large portion of the lands of the county, perhaps one-fourth, is owned by non-residents who hold it as an investment and for speculation.

The county was first settled about 1839, and was organized as a county in 1845. The land was not sectionized by the government until 1846, and the first entries or purchases from the government were made in 1849, and nearly all the land was entered before the war.

POPULATION AND PRODUCTION.

According to the United States census, the population of the county in 1850 was 2,447; in 1860, 10,636; in 1870, 14,636, of whom ten were colored. The population at the present time is about 20,000.

According to the census of 1870, the productions of the county were as follows: Corn, 756,607 bushels; wheat, 109,571 bushels; oats, 210,621 bushels; potatoes, 55,400 bushels; wool, 86,415 pounds; tobacco, 20,000 pounds; hay, 7,902 tons. Stock—Horses, 7,781; cattle, 18,297; sheep, 31,609; hogs, 31,993. Under the assessment of the county made for the 1st day of August, 1878, there were: Horses, 10,099; cattle, 34,636; sheep, 29,541; hogs, 56,209. By the assessment returns, only five counties in the State reported more horses than Harrison; only one county that reported more cattle or sheep, only five counties that reported more hogs. Thus it will be seen that Harrison is one of the very foremost stock raising counties in the State.

The surface of the county is gently rolling prairie, except along the streams, which are bordered with timber. It is estimated that nearly one-third of the county is timbered land. The timber consists mainly of oak, with some hickory, elm, walnut, cottonwood, ash, linden, etc. These afford abundance of timber for building purposes, for fences and fuel. Coal crops out at several points on Trail creek, and has been worked to supply the limited demand, but the great abundance of timber for fuel prevents coal being taken out extensively.

The soil is generally of a rich dark loam, from one to three feet deep, underlaid with clay, and but few counties in the State excel it in productiveness. The county is well watered.

HICKORY COUNTY.

Organized February 14th, 1845. The present population is 8,452. The face of the country and quality of soil—The county is very rough, hilly and rocky, but the soil is rich and productive; it is red, yellow and black. The principal streams are Sindy and Pomme de Terre rivers, running through the county, north and south, and in the eastern part of the county are the Big and Little Wableaux. Mineral resources—On the Pomme de Terre river there are several lead mines. Factories mills, etc.—Three flouring mills in the county. Exports—Wheat, flaxseed, cattle, sheep, hogs, mules and horses. The educational facilities are growing better in our county; we have about 20 public schools and two high schools; school fund, $4,000. Farm animals, and variety of breeds—Horses, mules and cattle; breeds of all kinds are improving; cattle, Devonshire and Red Durham; hogs, Berkshire, small and large. Bee culture is not very extensive; do not think there are 300 stands in the county. The principal towns are Hermitage, (county seat), Wheatland, in the central part, and Quincy. Newspapers—Two, at Hermitage and Wheatland. Dairy product—Two are three dairies in the county, and every farmer has from two to three cows.

Agricultural Products and Yield per Acre.

Tobacco does well; corn, good, 25 to 50 bushels; wheat, good, 15 to 28 bushels; rye, very little, 10 to 15 bushels; oats, good, 30 to 60 bushels; barley, none; flax, good article, 7 to 12 bushels; hemp, none; timothy hay, good, 1 to 1½ tons; clover hay, good, 1 ton; timothy seed, good, 5 to 7 bushels; clover seed, good, 3 to 8 bushels; vineyards, good; orchards are extensive, 5 to 20 bushels; small fruits and berries grow fine.

Number of horses, from 2 to 10 per farmer, valued at from $50 to $75 per head; cattle, principal stock, 3 to 4 year old steers, $20 to $35 per head; sheep, $1.50 to 2.25 per head; hogs are numerous; mules, for exporting and farming, $50 to $100 per head; Jacks, $150 to $300 per head; Jennets, $25 to $100 per head.

Forest culture or tree planting—Very little done, but grows beautifully. Hedge fencing—Osage orange used extensively on prairies. Land drainage—not much done; land is rolling, and does not need it.

HOWARD COUNTY.

Organized under the Federal Government, on the 23d day of January, 1816. Present population, 18,275. Face of county and quality of soil—Contains, geopraphically, upwards of 288,000 acres, is near the geographical centre of the State; surface of the county is high and rolling; the soil is a strong clay loam; fine bottom land along the southern part of the county, extending back from the river. Principal streams—Moniteau, Bonne Femme, and Salt creeks; the Missouri river flows all along the southwestern border of the county. Mineral resources—Coal crops out along some of the streams; mining is carried on on the Missouri, Kansas and Texas railroad. There are several large flouring mills, tobacco, lumber, wagon and carriage factories in the county. There are two railroads in the county; the Missouri, Kansas and Texas runs through the county, 35 miles, and the Chicago, St. Louis and Kansas City, has about 30 miles. Exports—Wheat, corn, tobacco, hay flour, horses, mules, cattle, etc. There are a large number of public schools in this county, one in each district, two colleges at Glasgow, and two colleges at Fayette. Principal towns—Glasgow, Fayette, New Franklin, Roanoke and Armstrong. Banks—Glasgow Savings Bank, Howard Savings Bank, Hendrix Bank, Fayette Bank. Newspapers—Central Missourian, Glasgow Journal, Howard County Advertiser, and the Independent, (Greenback).

Live stock.	Number.	Valuation.
Horses	5,571	$157,129
Cattle	14,185	171,882
Sheep	14,500	19,807
Hogs	35,775	59,181
Mules	3,124	109,878
Jacks and Jennets	42	2,645

Hedge fencing—Osage orange. Land drainage—very little done; results good.

HOWELL COUNTY.

Organized in 1853. Present population, 6,000. The face of the county is rough and broken, interspersed with rich fertile valleys; soil, clay loam.

Principal streams—North and South Forks of White river, Myatt and Bismett Bayous, Upper and Lower Spring creeks. Mineral resources—Plenty of iron, but no mines are worked. There are six mills and one cotton gin in the county. Cannot give the amount of land in cultivation; the amount of taxable land is 167,066, valued at $387,776. Exports—Wheat, cotton and live stock. We have 20 public schools in the county, and the West Plain Seminary; school fund, $3,000. Farm animals—Scrub horses, but some very good mules and oxen. Very little attention is given to bees; there are about 300 stands. Principal towns—West Plains, Hutton, Valley City and Brown Springs. Newspapers—West Plains Journal.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	20	1,000 lbs.
Corn		30 bus.
Wheat		10 "
Rye		15 "
Oats		25 "
Timothy hay		2,500 lbs.
Clover hay		4,000 "

Live stock.	Number.	Valuation.
Horses	2,277	$65,555
Cattle	6,161	44,111
Sheep	6,052	6,067
Hogs	21,187	21,453
Mules	675	21,495
Jacks and Jennets	35	585

JACKSON COUNTY.

Present population, about 60,000. Face of the county and quality of soil—Its topography is moderately undulating on the north side, near the Missouri river; the east, south and southwest is superior in topography, soil and water. Principal streams—The Missouri river

on the north, Big Blue entering at the southwest corner and empties into the Missouri river, Little Blue, north and south. The mineral resources are only limestone of a superior quality. Factories, mills, etc.—Several mills, factories and furnaces, besides those in Kansas City. Railroads, rock and gravel roads—Railroads, 90 miles; rock and gravel, 10 miles. Number of acres cultivated, 200,000; number of acres not cultivated, 100,000. Exports—No means of ascertaining. Educational facilities—There are 107 school houses in the county; and in the cities there are 91 teachers; amount of school fund, $113,725.40. Farm animals not reported. Bee culture is quite large, some raising 400 and others 1,500. The principal towns are Kansas City, Independence and Westport. Banks—Seven. Newspapers—Eight. Dairy product—Not reported.

LIVE STOCK.

Live stock.	Number.	Valuation.
Horses	9,274	$245,296
Cattle	20,366	261,975
Sheep	11,341	16,349
Hogs	53,307	98,430
Mules and Jacks	2,978	121,800

JASPER COUNTY.

The present population, 35,000. Face of the county and quality of soil is gently rolling; the bottom lands are generally very productive; the uplands are divided into two class of soils, black and mulatto, both rich and productive, and the mulatto is quite self fertilizing. The principal streams are Spring river, running 40 miles in the county; Center creek, Dry Wood Fork, North Fork, Coon creek, Jenkins creek, Jones creek and Turkey creek. The mineral resources, consisting of lead and zinc mines, are very extensive, averaging 1,500,000 pounds per week of the former, and 500,000 pounds per week of the latter.

Factories and mills, etc.—Of which there are ten factories, besides the lead and zinc smelting furnaces, and twelve flouring mills and fifteen saw mills in the county. Railroads, rock and gravel roads—66 miles of railroad, and no artificial rock and gravel roads, but excellent natural roads. Number of acres cultivated, 139,700, and valued, according to assessors books, at $1,257,300. Number of acres not cultivated, 279,619. Exports—Minerals, corn; winter wheat, stock oats, hay, pork, potatoes, flax, wool, beans, sorghum, barley, rye, cotton, tobacco, peas, peanuts, etc. Educational facilities—116 public schools and school houses; 6 private schools and 5 graded schools; school fund of $250,000. Farm animals and variety of breeds—Horses, of which good stock begins to predominate; cattle, Durham and Jersey, grades, and crosses; Sheep, Merino and Southdown, grades and crosses; hogs, Poland and China predominate, Berkshires following closely. The principal towns are Carthage, Joplin, Webb City, Oronogo, Sarcoxie, Scotland, Avilla, Preston, Medoc, Georgia City, Galesburg, Smithfield, Jasper, Mossville, Carl Junction and Alba. Banks—Six. Newspapers—Four dailies and six weeklies.

AGRICULTURAL PRODUCTS.

Article.	No. Acres.	Yield per acre.
Tobacco	100	
Corn	62,133	35 bus.
Wheat, winter	36,500	13 "
Rye	300	
Oats	2,000	30 bus.
Barley	300	
Flax	1,000	
Hemp	50	
Timothy hay	1,000	2 tons.
Clover hay	100	
Pastures	15,000	
Vineyard	250	
Orchards	1,500	
Small fruits and berries	150	
Castor beans	200	
Peanuts	150	
Sorghum	400	

Live stock.	Number.	Value.
Horses	8,638	$259,723
Cattle	26,775	236,883
Sheep	13,486	13,629
Hogs	44,402	47,768
Mules	2,121	71,889
Jacks and Jennets	37	1,975

Forest culture and tree planting—There are one or two premiums paid every year for tree planting. Hedge fencing—All osage orange, say 250 miles in county. Land drainage—No land drainage done or necessary.

LACLEDE COUNTY.

Organized February 24, 1849. Present population, about 9,380. Face of county and quality of soil—A great deal of timber, some small prairies; the prairies, valleys, and bottoms, near the streams, are of good quality and produce well; stock will do well on range seven months in the year. Principal streams—Gasconade, Osage Fork and Niagara, Bennets Big Spring, water for large mills, etc. Mineral resources—None worth mentioning. Factories, mills, etc.—Wool factories, and Lebanon flouring mill, grove elevator. The St. Louis and Southern railroad runs through the county. There are 289,921 acres of land in the county, valued at $1,023,503. We have common public schools and Laclede Seminary; $2,919 of school fund. Bees—Few stands; generally do well. The principal towns are Lebanon, Stoutland, Conway and Phillipsburg. Banks—Laclede County Bank, at Lebanon. Newspapers—Leader (Democrat), Journal (Republican), Rustic (Democrat), Anti-Monopolist (Greenback), and the Honey Bee. Dairy products are very small in this county.

AGRICULTURAL PRODUCTS.

Article.	Yield per acre.
Corn	60 bus.
Wheat	12 "
Rye	12 "
Oats	40 "
Flax	14 "

Live stock.	Number.
Horses	3,642
Cattle	8,327
Sheep	9,540
Hogs	17,582
Mules	1,024

Forest culture—Only one or two farmers planted any; grows well. Land drainage—But little required.

LAWRENCE COUNTY.

This countv was organized February 25, 1845. Present population, about 15,000. The face of the county is undulating; the surface is composed of decayed vegetable matter, mixed with various minerals, and suited for agricultural purposes. Our principal streams are Spring river, Honey creek, Turnback creek, Sac river, Cedar creek, Stahls' creek and William's creek. Mineral resources—A small quantity of coal is found in portions of the county, with light indications of silver. There are eleven flouring mills and two wagon factories. We have twenty-eight miles of railroad. About 39,000 acres are under cultivation, value not given, and about 350,000 acres not cultivated, value not given. The exports are live stock, corn, wheat, oats, rye, barley, flax seed and clover seed. We have eighty-six public schools, and $6,377.32 of the school fund was distributed. Considerable interest is taken in bee culture. The principal towns are Mt. Vernon, Pierce City, Marionville, Verona, Aurora and Lawrenceburg. Banks—Lawrence County Bank. Newspapers—Fountain and Journal, Chieftain, Pierce City Record, Empire and Southwestern Missourian. Dairy product—No regular dairy, but considerable amount made for home consumption.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco, 23 134 lbs		
Corn, 852,570 bushels		40 bush.
Wheat, 191,042 bushels		13 "
Rye, 3,028 bushels		15 "
Oats, 39,377 bushels		35 "
Barley, 1,150 bushels		18 "
Timothy hay	2,099	2 tons.
Vineyards		208 gal.
Orchards	1,000	
Small fruits and berries	500	

Live stock.	Number.	Valuation.
Horses	6,399	$207,08
Cattle	19,229	147,88
Sheep	14,517	14,51
Hogs	37,863	52,48
Mules	1,708	68,11

Forest culture or tree planting—None. Hedge fencing—Osage orange. Land drainage—Impossible to obtain amount.

LEWIS COUNTY.

Lewis county was organized in 1833. Present population of the county is about 17,000. The face of the county is comparatively level; soil, good. The timber nearly equals the prairie land in quality. The principal streams are the Mississippi river, Wyconda river, Middle and North Fabius. The creeks are Sugar, Troublesome and Grassy. The mineral resources are not worthy of mention. There are 11 flouring mills, 1 carriage factory, nine wagon factories and seven saw mills. Railroads—The Keokuk and St. Louis, twenty-two miles; Missouri Pacific, thirty miles. We have 100,000 acres under cultivation, valued at an average of $10.00 per acre, and 221,185 acres not cultivated. Educational facilities—Amount of school fund, $18,078.00; seventy-eight public schools and three colleges. The principal towns are Canton, Lagrange, Monti-

cello, Labell, Williamstown, Lewisburg, Steffinsville, Durkam and Maywood. Banks—Monticello Savings Bank, Labell Savings Bank, Lagrange Savings Bank and Savings Bank of Canton. Newspapers—Canton Press, Lagrange Democrat and Monticello Journal.

AGRICULTURAL PRODUCTS.

Tobacco, but little raised; corn, heavy; wheat, good; rye, but little; oats, heavy; barley, none; flax, none; hemp, none; timothy hay, a great deal raised.

Live stock.	Number.	Valuation.
Horses	8,116	$212,310
Cattle	20,435	24,940
Sheep	13,595	18,964
Hogs	29,264	50,180
Mules	1,857	56,650
Jacks Jenneta	65	1,740

We have no forest culture or tree planting. There is considerable hedge fencing in the county.

LINCOLN COUNTY.

Organized Friday, December, 1818. Present population is about 20,000. Face of the country and quality of soil—gently undulating; westward and southwestern part is limestone soil, eastern and northeastern, freestone soil. Principal streams, Cuivre river, Big creek, Coon, Bobs, Sugar, Sandy, Bryant Mill, Sulphur, Lead, Spring and Turkey creeks. Mineral resources—Coal fields covering about 5,000 acres. The Keokuk and St. Louis railroad has 32 miles. There are 294,213 acres of land cultivated, valued at $2,942,136; there are 196,142 acres which are not cultivated, valued at $631,994. Exports—Wheat, corn, oats, flax seed, tobacco, cattle, mules, horses and hogs. Educational facilities—2 high schools and 82 district schools. Principal towns—Troy, New Hope, Louisville, Elsberry, Trenton and Millwood. Bank—Farmers and Mechanics Savings, at Troy. Newspapers—Troy Free Press and Troy Herald.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Corn	63,380	40 bushels.
Wheat	38,070	20 "
Oats	43,587	30 "
Timothy hay	21,793	1,200 lbs.
Clover hay	20,000	1,000 lbs.
Timothy seed	397	6 bushels.
Clover seed	896	3 bushels.
Orchards	1,000	60 bushels.

Live stock.	Number.	Valuation.
Horses	6,965	$227,860
Cattle	15,499	185,420
Sheep	13,037	16,410
Hogs	36,473	73,590
Mules	1,752	69,380
Jacks	10	800
Jennets	13	550

Forest culture or tree planting—None. Hedge fencing—Bois d'arc. Land drainage—None.

LINN COUNTY.

Organized in 1837. Present population is about 20,000. Face of the county and quality of soil—Undulating, prairie and timber; about one-fourth timber, balance prairie; soil, dark loam. Principal streams—Locust creek, Yellow creek, Parson creek and various smaller streams. Mineral resources—The whole county is underlaid with stone coal, of from 20 to 27 inches in thickness, also lime and sandstone. Factories, mills, etc.—There are ten grist and flouring mills, three by water, and balance by steam; two woolen factories. There are 41 miles of railroad—The Hannibal and St. Joseph, the Burlington and Southwestern, and St. Louis, Kansas City and Northern. There are 289,413 acres of land cultivated, valued at $1,316,015; there are 96,471 acres which are not

cultivated; valued at $432,008. Exports—Wheat, rye, oats, corn, tobacco, timothy hay and seed, etc. Educational facilities—There are 106 public schools, including 6 graded schools; township fund, $9,000; county fund, $35,000; from State, $3,000 per year. Farm animals—Horses, cattle, sheep and hogs. Bee culture is carried on to a considerable extent. Principal towns—Linneus, Brookfield, St. Catharine, Laclede and Meadville. Banks—Combs, Wilkerson & Co. of Linneus, H. Degraw & Co. of Brookfield. Newspapers—Linneus Bulletin, Brookfield Chronicle and Brookfield Gazette; the two former are Democratic and the latter Republican. Dairy product—At least 7,000 cows.

AGRICULTURAL PRODUCTS.

Article.	Yield per acre.
Tobacco	80 to 1,000 lbs.
Corn	40 to 60 bush.
Wheat	12 to 20 "
Rye	15 to 25 "
Oats	40 to 50 "
Barley—Very little raised.	
Flax—Very little raised.	
Hemp—None raised.	
Timothy hay	1 to 1½ tons.
Clover hay	1 to 1½ "
Timothy seed	8 to 10 bush.
Clover seed—Very little saved; does very well.	
Vineyards—A great many small vineyards.	
Orchards—Do well.	
Small fruits and berries—Do well.	

Live stock.	Number.	Valuation.
Horses	8,077	$235,148
Cattle	26,081	356,687
Sheep	29,237	29,237
Hogs	29,971	51,028
Mules	1,364	45,838
Jacks and Jennets	18	525

Forest culture or tree planting—Very little done. Hedge fencing—Osage orange. Land drainage—Very little done, but is successful.

LIVINGSTON COUNTY.

Livingston county was organized in 1837, and its present population is 20,000. The surface of the county is varied. There are high rolling prairies, bottom prairies, upland timber and bottom timber; mounds, moderate hills and beautiful vales. Grand river, a considerable stream, though not navigable, flows diagonally through the county from northwest to southeast. Medicine creek rises in Iowa and flows southward across the eastern portion of the county into Grand river. Shoal creek, rising 50 miles west, flows into Grand river three miles south of Chillicothe. Other affluents of Grand river in this county are Clear, Honey, Crooked, No, Muddy, Parsons, Big and Little Indian, Mound, Rattlesnake, Lake and Toe-string creeks. On all these streams grow white, black and pin oaks, black walnut, hickory, elm, maple, basswood, ash, pecan, cottonwood and sycamore. Besides timber on the streams, portions of the county have all varieties of the timber on the uplands. There is but little of the county too rough for cultivation. The bottom lands on Grand river and the principal creeks afford extensive range where cattle will remain in good condition upon native grasses, and hogs grow fat on mast throughout an ordinary winter. There are many springs, and water can be obtained anywhere in the county at fifteen or twenty feet. The whole of Grand river valley is exceedingly rich and fertile, but Livingston county, by reason of centrality of location, possesses many advantages not found in other counties in North Missouri. Being the center of a system of water courses, the natural tendency of trade, and all the activity of life throughout the valley, is to flow to or through this county, which already contains the largest city, the best schools, the best railroad facilities and the greatest population of any county in North Missouri, except those on the Mississippi and Missouri lines. In the opinion of the writer, decidedly the best county in North Missouri for the farmer, stock raiser, merchant, manufacturer, mechanic or professional man, is Livingston, of which Chillicothe is the county seat. Its rich soil; its ample supply of water, timber and rock; its railroad system; its abundant educational facilities; its healthful climate; its hospitable and law-abiding citizens; its excellent roads and substantial bridges; its adaptation to produce in abundance all the grains, grasses, fruits, tobacco, and every product growing in this latitude, combine to prove the truth of the above allegation—no other county in North Missouri possessing so many good qualities or presenting so many advantages to those seeking homes in the West. Mineral resources—From eighteen to twenty inch veins of coal under a portion of the county.

Factories, mills, etc.—One wagon factory, ten grist mills, and a woolen factory. Railroads — Hannibal and St. Joseph, twenty-one miles; Omaha extension of St. Louis, Kansas City and Northern railroad, thirty miles. There are about 166,976 acres in cultivation, and about 166,975 acres not cultivated. Exports—Wheat, flax seed, tobacco, apples, hides, tallow, eggs, etc. Educational facilities—Outside of Chillicothe, ninety-six schools; in city, fourteen—twelve white and two colored. Farm animals—Improved breeds of stock have been introduced within the last few years, and there are now some very fine stock in the county, and the interest in improved breeds is great among the people. The number of bee-stands is estimated at 2,500. The principal towns are Chillicothe, Utica, Bedford, Dawn, Mooresville, and Wheeling. Banks—The Peoples Savings Bank, and the Chillicothe Savings Association. Newspapers — Chillicothe Tribune, Chillicothe Constitution, Chillicothe Crisis, and Utica Herald, all weeklies.

AGRICULTURAL PRODUCTS, AS PER CENSUS TAKEN IN 1876.

Tobacco, 1,471,998 lbs.; corn, 1,921,991 bushels; wheat, 131,211 bushels; rye, 41,200 bushels; oats, 211,645 bushels. Vineyards, estimated at 100 acres.

Number of live stock in 1876—Horses, 7675; cattle, 20,329; sheep, 32,268; hogs, 32,065; mules, 1,705; jacks, 33; jennets, 30.

No forest culture or tree planting done, beyond planting ornamental and shade trees. Hedge fencing—A large amount of osage hedge.

MACON COUNTY.

Macon county was settled in 1832, and organized in 1838. Present population, 23,800. A varied soil, mostly fertile black loam, and well adapted to fruit. All kinds of grain are successfully grown; blue grass is of spontaneous growth; timothy of the finest quality. The principal streams are the Chariton with its forks and tributaries, Walnut, Turkey and Brush creeks, Salt river and Bear creek. Mineral resources—Very fine coal and stone; eight coal pits are being worked. Total acreage, 529,920. Free schools in every district, which are well conducted. Farm animals—Norman and Clydesdale horses, Jersey and Durham cattle, Poland-China hogs, Cotswold, Leicester and Southdown sheep. 800,000 lbs. of tobacco were grown last year.

MADISON COUNTY.

Organized December 14, 1818. Present population, 9,000. Rolling land and loamy soil. The principal streams are Big St. Francois, Little St. Francois, Caster and Twelve Miles. Mineral resources are lead, cobalt, copper, iron and silver. Factories, mills, etc., are six water grist mills, two steam grist mills and five saw mills. There are 23⅓ miles of the St. L., I. M. & S. railroad, and 7 miles of gravel road. One-third of the county is cultivated. Total number of acres, 292,484, and 626 town lots. Exports are flour, wheat, pork, cattle and tobacco. There are 46 school houses, and $9,000 in school fund. School tax, $6,000. Farm animals—Horses, mules, jacks, jennets, cattle, sheep and hogs; one-half of the mules and horses are work stock. Bee culture—400 stands. Principal towns are Fredericktown, Mine LaMotte, Marquand and Silver City. Bank—Schurete, Hill & Valle. Newspaper—One. Dairy product—F. G. Grigery's 16 cows average 40 gallons of milk per day.

There are five mile of osage orange hedge fencing.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco raised in 1876, 24,068 lbs.		
Corn raised in 1876	251,902	35 bus.
Wheat	40,636	10 bus.
Rye	338	25 bus.
Oats	42,088	25 bus.
Barley	372	40 bus.
Timothy hay		2 tons.
Clover hay		1 ton.
Vineyards	25	

Live stock.	Number.	Valuation.
Horses	2,014	$45,433
Cattle	4,566	38,365
Sheep	4,752	4,197
Hogs	11,020	12,144
Mules	804	33,160
Jacks	18	445
Jennets	16	300

MARION COUNTY.

Organized December 23, 1826. Present population, 25,000. Face of the county and quality of soil—Hilly near the Mississippi river and undulating five miles back; the western part generally level; limestone soil. Principal streams are North river, South river, North Fabius and South Fabius rivers. Factories, mills, etc.—There are two cheese factories near Palmyra, business fair; also, one tobacco factory. In Hannibal, 4 flouring mills and 5 lime kilns producing 1,000 barrels daily; 125,000,000 feet of lumber handled annually; 12 plaining mills; Loomis & Snively's coal oil and salt emporium handles 25,000 barrels of oil annually, manufacture their own barrels, and use 500 to 1,000 cars of anthracite coal, and 300 tons of soft coal annually; one foundry, by C. A. Treat, employs 50 hands, turn out 400 car wheels monthly, 75 to 100 tons of castings, and does a general foundry business; one car factory in which all kinds of cars are made. Two flouring mills in Palmyra. Railroads, rock and gravel roads, number of miles each—Wabash, 1 mile; St. Louis, Keokuk & N. W., 18 miles; Q. M. P., 8 miles; H. & St. Joe, 36¾ miles; M., K. & T., 7 miles, and 5 miles of gravel road. There are 200,000 acres cultivated and valued at $2,382,770. Number of acres not cultivated, 78,040; valuation, $390,200. Exports are horses, mules, cattle, hogs, sheep, wheat, corn, oats, hay, cheese and tobacco. There are 55 public schools, and $50,000 in the school fund; also, St. Paul's College, Ingleside College and Palmyra Seminary. Hannibal has Summer's High School, Hannibal Academy, St. Joseph Convent, one German High School, and three other private schools. Farm animals, variety of breeds and amount of work stock—Clydesdale, Percheron Norman, Revenue horses, Short-horn, Jersey and Devonshire cattle, Poland-China, Berkshire, Essex and Chester White hogs, Cotswold and South down sheep. There are 2,500 bee-stands. Principal towns are Hannibal, the metropolis, and Palmyra, the county seat. Banks are Marion County Savings, Bates, Lee & Co., of Palmyra; Farmers & Merchants, and Rowe Armstrong & Co., of Hannibal. Newspapers—Palmyra Spectator, and Marion County Democrat, Palmyra; Hannibal Clipper, Hannibal Journal and Hannibal Courier. About 12 cheese and milk dairies, average 20 cows each; no means at hand to obtain annual product.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco, good	125	800 lbs.
Corn, good	50,000	40 bus.
Wheat, good	30,000	20 "
Rye, very little raised		
Oats	3,333⅓	30 "
Hemp, fair	50	800 lbs.
Timothy and clover hay	8,666⅔	1½ tons.
Clover seed, good	500	2 bus.
Vineyards, good	30	1,500 lbs.
Orchards, every farmer has one.		
Small fruits and berries largely cultivated.		

Live stock.	Number.	Valuation.
Horses	7,051	$230,011
Cattle	18,670	276,735
Sheep	12,325	18,115
Hogs	38,890	77,115
Mules	1,437	58,655
Jacks	13	975
Jennets	26	475

No tree planting or cultivating except fruit, which is extensively done. A large number of miles of osage orange hedge fence, but have no means of obtaining the number. Not a large amount of drainage is done, but with favorable results.

MISSISSIPPI COUNTY.

This county was separated from Scott in 1845. Present population, 8,000. The face of the country is level prairie and timber; soil is varied—loam, sandy and buckshot. Our principal streams are the Mississippi river, Stephenson's bayou and James' bayou. Bog iron is the principal mineral, and is found in small deposits. There are eight saw mills and seven grain mills (two merchant.) There are forty-one miles of railroad in the county. Sixty-five thousand acres are in cultivation; valued at $881,534. The number of acres not cul-

tivated, 195,000. One million bushels of corn and one hundred thousand bushels of wheat have been exported. There are thirty schools, and one central school in the county. Our principal farm animals are horses, mules, cattle, jacks, jennets, hogs and sheep. We have 1,000 stands of bees. Charleston, Bertrand and Belmont are the principal towns. There are three papers in the county, viz: Enterprise, Courier-Gazette and Sentinel.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Corn	57,000	40 bus.
Wheat	8,000	12½ "

Live stock.	Number.	Valuation.
Horses	1,486	$51,405
Cattle	5,042	39,023
Sheep	400	525
Hogs	18,497	22,636
Mules	1,291	53,445
Jacks	11	570

In forest culture or tree planting, we have ten acres of catalpa sproutings.

MONROE COUNTY.

Monroe county was organized during the session of the Legislature of 1830 and 1831. Our present population is about 20,000. The face of the county is gently undulating, interspersed with streams, timber and prairie lands; the soils are rich and productive, adapted to the growth of all the cereals, grasses and tobacco. The principal streams of the county are the four branches of Salt river, running from east to west, furnishing fine water power. We have coal in great abundance, and some iron deposits. There are woolen mills for cloth, flouring mills, and farmers' implement factories. The Hannibal and St. Joseph, and Missouri, Kansas and Texas roads run centrally though the county from

east to west. We have 283,500 acres in cultivation, valued in 1879 at $15 per acre; total valuation, $4,252,000. The number of acres not in cultivation, 140,000. Exports are corn, wheat, tobacco, hay, horses, cattle, mules, hogs and sheep. The county has ninety-seven schools, with a fund of $107,000. Our farm animals are principally of the improved breeds, and first class generally. Bee culture has received very little attention. Paris, (county seat), Monroe City, Madison, Florida, Santa Fe and Holliday are the principal towns. We have two banks. Monroe county has three newspapers—the Paris Mercury, Monroe County Appeal and Monroe City News. Dairy product, 4,500 cows.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	2,500	800 lbs.
Corn	150,000	40 buss.
Wheat	8,000	18 "
Rye	1,000	25 "
Oats	10,000	30 "
Timothy hay	65,000	2 tons.
Clover hay	30,000	1½ "
Timothy seed		3½ bus.
Clover seed		6 "
Vineyards	1,000	1,500 lbs.
Orchards	4,000	600 bus.
Small fruits and berries	500	

Live stock.	Number.	Valuation.
Horses	9,767	$300,000
Cattle	21,971	300,000
Sheep	22,985	30,000
Hogs	37,307	65,000
Mules	3,665	120,000
Jacks Jennets	127	5,000

The county has 2,000 miles of osage orange hedge fencing.

MONTGOMERY COUNTY.

Organized December 14, 1818. Present population, about 20,000. Face of the county and quality of soil—The center and northern portion is prairie, the southern, hilly; bottom lands along the river. The hills are variable, some have a rich soil, some poor, thin clay, and some are rocky. The bottom is, on the average, two miles wide. Principal streams—The Missouri river borders on the south, the Cuivre crosses the northeastern part, the Coon, Elkhorn, Brush and Bear creeks run northeastward and empty into the Cuivre. The Loutre creek starts near the northwest corner of the county, runs southward and empties in the Missouri near the southwest corner. Smith's, Clear and Bear creek are the main streams that empty into the Missouri from the west, and the Dry Fork from the east. The Quick and Modoc creeks empty directly into the Missouri. Mineral resources—Coal toward the northwest, little worked up; iron in the hills, not worked. There are several cheese factories on the prairie, and grist and saw mills scattered all over the county. The St. Louis, Kansas City and Northern railroad crosses the county from southeast to northeast; length, about fifty-two miles. No rock nor gravel roads. The principal towns are Danville, the county seat, with 250 inhabitants; Montgomery City, with 1,300, Wellsville with 800, New Florence with 450, Jonesburg with 500, and Middletown with 500 inhabitants. The first of these towns is on the prairie, five miles south of Montgomery City and five west of New Florence, the next four are on the railroad, and Middletown on the Coon creek, 10 miles northeast of Wellsville. Other business places or villages are scattered all over the county. Newspapers—Standard and Ray, both published in Montgomery City, and the Optic, published in New Florence.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	25	500 lbs, hills 1000 " bottom
Corn	75,000	35 bushels.
Wheat	10,000	15 "
Oats	50,000	30 "
Flax	650	10 "
Timothy hay	100,000	½ ton.
Clover hay	1,000	.....
Vineyards	200	100-300 gall's.
Orchards	1,000	.....

Live stock.	Number.	Value.
Horses	6,510	$186,157
Cattle	14,720	181,785
Sheep	10,522	10,552
Hogs	82,115	52,564
Mules	2,129	72,542

Forest culture or tree planting—None. Osage orange fences, about 75 miles.

MORGAN COUNTY.

Morgan county was organized in 1833. Present population, 12,000. The north half of the county is prairie, and the soil a black loam; the south half is timbered and rather hilly; the bottoms are very rich. The hills are well timbered, and there are also large deposits of lead all over the south half. Principal streams—Moreau, Big and Little Gravois, Big and Little Buffalo, Richland, Flat and Haw creek, and other minor streams. Mineral resources—Lead, black jack, porcelain earth, clay, bituminous and cannel coal. Factories, mills, etc.—One woolen factory, five steam and four water mills and two smelting furnaces for lead ore. Four miles of railroad are completed, twelve miles graded and thirty-five surveyed. About three-fourths of the north half and one-fifth of the south half of the county in cultivation. Exports—Wheat, over one-half that is raised is exported; corn is mostly fed to hogs. There are about seventy-five public schools, and we draw of the public school fund about 60 cents to each of the 1,800 scholars. Farm animals—Horses, Norman, Glendower and others; cattle, Durham and natives crossed; hogs, Berkshire; sheep, Cotswold and Southdowns. Bee culture—about 25,000 stands. The principal towns are Versailles (the county seat), Excelsior, Florence, St. Martin and Barnettsville. One bank, owned by Kelsey & Briscoe. Newspapers—Gazette and Western Register.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco, but little raised		
Corn	150,000	40 bushels.
Wheat	10,000	20 "
Rye	1,000	10 "
Oats	15,000	20 "
Flax	15,000	5 "
Timothy hay	7,500	2 tons.
Clover hay	1,150	2 "
Timothy seed		6 bushels.
Orchards	1,000	100 "

Live stock.	Number.	Value.
Horses	4,000	$115,000
Cattle	18,000	180,000
Sheep	14,000	14,000
Hogs	15,520	28,420
Mules	1,600	55,000
Jacks	18	1,000
Jennets	20	500

Hedge fencing—A large amount in the north half on the prairie. Land drainage—Very little done, and not necessary.

NEWTON COUNTY.

Organized in 1840. Present population is about 18,000. The county is composed of prairie and timber; soil on the prairies, creeks and valleys is good; in the timber, some good and some inferior. Principal streams—Shoal creek, Lost creek, Indian creek, Clear creek, Buffalo creek and Hickory creek. Mineral resources—Lead is found in large quantities, the famous Granby Mines being in this county. Factories, mills, etc.—There are 3 wagon factories, 1 woolen factory and 8 good flouring mills. Railroads—There are 35½ miles of railroad. Number of acres in cultivation, about 120,000, valued on assessment book at $1,800,000; number of acres not cultivated, about 250,000. Exports—Wheat, tobacco, fruit and lead. Educational facilities—There are 85 schools; amount of public school fund is about $30,000. Farm animals—Horses and mules, some of good quality. Bee culture—None.

Principal towns—Neosho, Newtonia, Gray and Seneca. Banks—One. Newspapers—Three. Sorghum is extensively cultivated, and yields 300 gallons per acre.

AGRICULTURAL PRODUCTS.

Article.	Yield per acre
Tobacco	800 lbs.
Corn	40 bushels.
Wheat	10 "
Rye	15 "
Oats	40 "
Timothy hay	2 tons.
Clover hay	2½ tons.
Vineyards, 10 or 12 in county.	
Orchards, nearly every farmer has from 200 to 1,000 trees, mostly young.	
Small fruits and berries, good assortment.	

Live stock.	Number.	Valuation.
Horses	6,019	$173,3[illegible]
Cattle	15,720	125,9[illegible]
Sheep	11,286	11,3[illegible]
Hogs	32,122	40,[illegible]
Mules	1,485	54,[illegible]
Jacks and Jennets	36	[illegible]

Hedge fencing—Osage orange, (amount limited and unknown).

NODAWAY COUNTY.

Organized in 1840. First settler, Herman Hall, in 1840. First county court met in 1845. Population, last State census, 23,000; present, 30,000. Face of the county and quality of soil—Undulating or slightly rolling; soil, clay loam; one-fifth timber and four-fifths prairie; two-fifths in cultivation. There is practically no low, swamp or waste land in the county. Principal streams—Nodaway, Platte and One Hundred and Two rivers, and their affluents, which run southward through the county. Mineral resources—Bituminous and cannel coal are known to exist at several points; fire clay, brick clay, potters clay, sand and limestone. Factories, mills, etc.—1 foundry, 1 woolen, 1 car-

riage, 2 plow, 5 wagon factories; 1 steam and 8 water mills. Railroads—Kansas City, St. Joseph and Council Bluffs, north and south, and St. Louis and Northern, from southeast to northwest, 74 miles built and 80 miles contemplated, which will be built soon. Number of acres n cultivation, 223,900, worth $20.00 per acre, or $4,478,000; raw lands, timber and prairie are worth from three to ten dollars per acre. Number of acres not cultivated, 330,000. Exports—Hogs, cattle, mules, sheep, horses, wheat, corn, oats, etc. Educational facilities—There are 6 high schools, 160 public schools and 4 private seminaries; county funds, $97,000. Farm animals—Cattle, mostly Durham; three grades of sheep; hogs, all breeds; horses better than heretofore. Bee culture—Approximated, 2,000 stands. Principal towns—Marysville, the county seat, population 3,500, Hopkins 1,400, Graham 400, Barnard 600 and Clearmont 500. Banks—Nodaway Valley, Farmers, Hopkins, Bakers, Sanders & Co. Newspapers—Marysville Republican, Nodaway Democrat, Greenback Standard, Hopkins Journal and Barnard Times. Dairy products—Not given.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	10	800 lbs.
Corn	125,000	40 bushels.
Wheat	40,000	18 "
Rye	8,000	17 "
Oats	30,000	40 "
Barley	2,000	25 "
Timothy hay	10,000	2 tons.
Clover hay	6,000	2 tons.
Vineyards	40	
Orchards	2,840	
Small fruits and berries	10	
Total in cultivation	223,900	

Live stock.	Number.	Valuation.
Horses, 1878	12,205	$398,079
Cattle, 1878	43,143	487,623
Sheep, 1878	16,434	16,846
Hogs, 1878	78,137	103,866
Mules, 1878	1,825	70,565
Jacks and Jennets	44	1,595
Total valuation of live stock		$1,078,574
Total personal property		1,170,202
Total land or real estate		5,902,860
Total valuation		$8,157,200

Forest culture or tree planting—A practical interest is aroused in tree planting. Hedge fencing—There are 2,000 miles of osage orange. Land drainage—Seven miles, results good; quite a lively interest manifested.

OSAGE COUNTY.

The county was organized in 1842, and its present population is between twelve and fifteen thousand. The surface of the county is broken and hilly, except along the streams where it is level and very rich. The principal streams, are the Missouri river on the north, Osage on the west, and Gasconade on the east, with several minor streams running through the county. The mineral resources are iron and lead. Iron in quantity. We have steam and water flouring mills and saw mills. Railroads—Pacific railroad, about twenty-four miles. There are 368,800 acres in the county, valued at $1,224,609.00, as per assessments of 1879, about one-fifth of which is under cultivation. There are sixty-three school districts, and from one to three schools in each. The school fund amounts to about $30,000.00. Farm animals—Some full bloods and graded stock of all kinds, but not in large numbers yet. The principal towns are Chamois, Linn, Westphalia, Koeltztown and Richfountain. Newspapers—Linn News and Chamois Liberalist.

AGRICULTURAL PRODUCTS.

Article.	Yield per acre.
Tobacco	1,000 lbs.
Corn	40 to 45 bus
Wheat	15 to 30 bus
Oats	30 to 40 bus
Barley	30 to 40 bus
Timothy hay	1 ton.
Clover hay	1½ tons.
Vineyards, 250.	

Live stock.	Number.	Valuation.
Horses	3,522	$102,037
Cattle	12,116	95,341
Sheep	10,303	10,324
Hogs	26,434	34,176
Mules	2,640	101,902
Jacks	23	1,033

PEMISCOT COUNTY.

Pemiscot county was organized in 1852, and the present population is about 8,000. The face of the county is level and abounds with lakes. The soil is rich and fertile, with black sandy loam, about one-tenth part buckshot. The principal streams are little rivers running through the county from northeast to the southwest, a number of bayous, and Mississippi river on the east. Mineral has not yet been discovered in the county. We have nine mills, twelve cotton gins and two broom factories. No railroads or gravel roads in the county. We have 25,000 acres in cultivation, valued at $200,000; not cultivated, 225,000 acres. The exports amounted to $110,000. Educational facilities are very good; number of school houses, twenty-four; amount of school fund, $15,000. The work stock consists of horses, mules and cattle of common stock, about 3,000. Bee culture—1,200 stands. The principal towns are Gayoso, Caruthersville and Lindale. The Gayoso Democrat is the only paper published in the county. Number of milk cows, about 1,800.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	50	1,600 lbs.
Corn	19,750	35 bushels.
Wheat	500	20 bushels.
Oats	300	40 bushels.
Sorghum	100	120 gallons.
Timothy hay	150	1½ tons.
Clover hay	150	1½ tons.
Orchards	300	
Cotton	8,700	

Live stock.	Number.	Valuation.
Horses	1,335	$44,141
Cattle	5,129	31,183
Sheep	636	730
Hogs	12,160	17,288
Mules	464	19,450
Jacks	5	500
Jennets	21	660

All drainage is local, and does not exceed five miles.

PERRY COUNTY.

Organized in 1821. Present population, 12,000. The surface of the county is broken and undulating, supporting fine forests of timber for building purposes, with rich soil. Principal streams—We have the Mississippi river on our northern and eastern borders, the Saline creek in the western part of the county, the Conquehome in the center of the county and the Apple creek in the south of the county. Mineral resources—Lead in paying quantities; one smelting furnace at Silver Lark, in the western part of the county; also iron. Factories, mills, etc.—We have no factories; have three merchant mills. Railroads, rock and gravel roads—None. Number of acres cultivated, 294,141, valued at $1,178,870. Exports—Wheat, corn, beef and hogs. Educational facilities—There are 48 public schools in the county; amount of the school fund in the county, $29,516.40. Farm animals—Horses, mules and some cattle; the amount of work stock—horses, 3,000; mules, 1,400; and cattle, 50 pairs. Bee culture—About 200 stands. Principal towns—Perryville, (the county seat), Altenburg, Wittenburg, Claysville, and some small villages. Banks—None. Newspapers—We have two newspapers in the county; both printed in Perryville. Dairy product—None.

AGRICULTURAL PRODUCTS.

Article.	No. acres	Yield per acre.
Corn	20,000	35 bushels.
Wheat	30,000	10 to 30 "
Rye	25	15 "
Oats	6,000	30 "
Barley	100	35 "
Timothy hay	200	1½ tons.
Clover hay	4,000	1 ton.
Clover seeds, 400 bushel.		
Vineyards	25	800 lbs.
Orchards	2,000	
Small fruits and berries	20	

Live stock.	Number.	Valuation.
Horses	4,169	$127,525
Cattle	7,219	51,651
Sheep	7,527	7,622
Hogs	28,603	33,243
Mules	1,942	60,840
Jacks	12	1,035

Forest culture or tree planting—None. Hedge fencing—A few osage orange. Land drainage—None.

PLATTE COUNTY.

Was organized in 1838, and at one time was one of the first counties in the State in population and wealth. It now has a population of about twenty thousand, one thousand of which are colored and one thousand foreign born. It has very many old, influential and wealthy citizens, occupying farms of great extent, and will compare in wealth and influence with many more populous counties. It is mostly a timbered country, with small prairies interspersing the magnificent growths of timber, in which walnut, elm, oak, linden, hackberry, ash and hickory abound. The entire area of the county, both upland and bottom, is of unsurpassed excellence, depth and fertility. The Missouri river forms its western and southwestern boundary, and for seventy-five miles washes the banks of Platte county as it rolls between its shore and the shore of the State of Kansas on the opposite side. It has more miles of fertile bottom lands on the Missouri river than any other county in the northwest. These bottom lands average five miles in width from the river, and can produce more hemp, grain and grass to the acre than any land in the world. The uplands, although of the richest soil and wonderful fertility, are most excellently adapted to the cultivation of fruit. When the first settlers rushed in from Clay and Ray counties, where they had been awaiting the opening of the Platte purchase to settle-

ment, they found the highest evidence of the richness of the country and its adaptability to fruit culture, in the wild pea vine higher than their horses heads and the wild plums and grapes in fabulous abundance and luxuriance.'

Face of county—One-fifth undulating prairies, soil first class; balance timbered, surface rolling; three-fifths of timber land first class, one-fifth second class and one-fifth third class. Principal streams are Platte river, Smith's Fork Platte river, Dick's creek, Prairie, Bear, Brush, Bee, Moore, Todd and Second Creeks. Mineral resources—Deposits of coal, but too deep for profitable mining at present; good building stone and clay for brick. There are 12 flouring mills, 24 saw mills, 2 furniture factories and 3 distilleries. Railroads—Kansas City, St. Joseph and Council Bluffs, 40 miles, and Chicago, Rock Island P. and Atchison Branch, 40 miles. Number of acres in cultivation, 150,000, valued at $3,000,000; number of acres not cultivated, 68,891, valued at $700,000. Exports—Wheat, corn, tobacco, apples, rye, hogs, horses, mules, cattle, bacon, lard, hemp and walnut lumber. There are 72 public schools in the county, taught ten months, and four high schools; school fund ample and well secured. Bee culture—5,000 stands. Principle towns—Platte City, Parkville, Waldron, Farley, Weston, Iatan, New Market, Camden Point, Edgerton, Ridgley, East Leavenworth, Hampton and Sinkville. Banks—There are two at Platte City, one at Weston and one at Parkville. Newspapers—Advocate and Landmark at Platte City, and the Commercial at Weston. Dairy product—15,000 milk cows for private use, and no estimate of product.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Corn	40,000	40 bushels.
Wheat	20,000	15 "
Rye	5,000	30 "
Oats	5,000	20 "
Barley	700	15 "
Hemp	1,000	800 lbs.
Timothy hay	5,000	2 tons.
Clover hay	10,000	4 tons.
Vineyards	500	Very large.
Orchards	2,000	Good.
Small fruits and berries	100	Large.

Live stock.	Number.	Valuation.
Horses	9,000	$275,000
Cattle	25,000	500,000
Sheep	7,672	15,000
Hogs	52,891	84,814
Mules	2,725	112,545
Jacks	25	7,500
Jennets	68	3,440

Hedge fencing—About 1,000 miles. Land drainage—A good deal done; estimate cannot be made correctly.

RANDOLPH COUNTY.

Organized, 1829. Present population, 25,000. Randolph county is situated in the northeast central part of the State. Bounded on the north by Macon and Shelby; on the east by Monroe and Audrain; on the south by Howard and Boone, and on the west by Chariton county. It contains 307,677 acres. The Grand Divide, between the Mississippi and Missouri rivers, passes in a northern direction through the eastern part of the county, leaving more than one-fourth on the east drained by streams running to the Mississippi, while on the west the streams flow into the Missouri. The slopes east of this divide and near the prairie, are gentle, but as the streams enlarge, the hills are larger also. In the west, along Silver creek, the county is quite hilly. Between the Chariton and Sweet Spring, in the west, the land is rolling and undulating. The slopes adjacent to Dark and Muncus creeks are gentle, becoming more hilly near the Middle Fork of the Chariton. In the northern part of the county, between the East and Middle Forks, the county is undulating. Near the East Fork, Walnut and Sugar creek, it is quite hilly. The prairie, east of the Grand Divide, with the timber skirting it, composes about one-third of the county, and is finely adapted to farming, stock raising and general agricultural pursuits. The western part of the county is mostly timbered land, interspersed, however, with rich prairie, and is of superior productive qualities. The timber is principally elm, cottonwood, shellbark hickory, linden and burr, swamp, red, white and black oak, sycamore, hackberry, birch, sugar and white maple. There are some large bodies of very rich land

in different portions of the county. The bottoms of the East and Middle Forks of the Grand Chariton and Sweet Spring creeks are very flat, but have generally been sufficiently drained to be cultivated, and are very productive. Taken as a whole, the county, for agricultural pursuits, ranks well up with the best in the State, and for timothy, clover and blue grass is not surpassed by any in the State. The principal productions are corn, rye, wheat, oats, sorghum, potatoes, navy beans and tobacco. Apples, pears and grapes succeed well all over the county. Peaches are not a certain crop, but occasionally they bear abundantly, and of the best quality. Small fruits, such as straw, rasp and blackberries, currants, cherries and such like are never-failing. The mineral productions are coal, fire and potters' clay, copperas, and building and sandstone. Coal especially is abundant, and is seen in many localities cropping out, and is now being mined successfully and largely at Huntsville, Jacksonville, Renick and Higbee. The shipment from Huntsville alone of that article for the year 1879, aggregated, with that furnished the engines, over two millions of bushels. Factories, mills, etc.—One woolen mill, twelve tobacco factories, and seven steam flouring mills. Railroads—Wabash, St. Louis and Pacific, 44 miles in the county; Missouri, Kansas and Texas, 28 miles, and the Chicago and Alton, 18 miles. The number of acres aggregate 308,000, value $2,156,000; one-fourth not cultivated. Exports—Tobacco, hay, corn, wheat, horses, mules, cattle and hogs. There are seventy-five public schools in the county, and the amount of the school fund, including that received from the State, is $80,000. Farm animals—Well supplied with the best breeds. Bee culture—Very little done. The principal towns are Moberly, Huntsville, Renick, Cairo, Jacksonville, Higbee and Clifton. Banks — Three. Newspapers—Four weeklies and two dailies.

AGRICULTURAL PRODUCTS AND YIELD PER ACRE.

Tobacco, 800 lbs.; corn, 35 bushels; wheat, 15; rye, 20; oats, 30; barley, 30; timothy hay, 2 tons; clover hay, 2 tons. Vineyards not reported, but quite extensive.

Live stock.	Number.	Value.
Horses	6,410	$217,518
Cattle	8,642	138,382
Sheep	20,898	28,166
Hogs	23,480	36,284
Mules	1,947	71,554
All other live stock	5,877	89,926

Forest culture or tree planting—Very little done. Hedge fencing—Osage orange, 25 miles. Land drainage—Nearly all the swamp land in the county is drained.

RAY COUNTY.

Organized in 1821. Present population, about 23,000. Face of the county and quality of the soil—One-third bottom, balance undulating; soil alluvial. Principal streams—Missouri river on south boundary; Fishing river through southwest portion of county, and Crooked river through center of county, from north to southeast. Mineral resources—Stone coal in abundance. Factories, mills, etc.—Six carding factories, and fifteen flouring mills. There are sixty-five miles of railroad in the county. Number of acres cultivated, 236,858, valued at about $15.00 per acre; number of acres not cultivated, 118,329. Educational facilities—Ninety-seven white and eight colored schools; school fund $38,769.81. Bee culture—About 3,500 stands. Principal towns—Richmond, Hardin, Camden, Albany, Vibard, and Lawson. Banks—J. S. Hughes & Co., and Ray County Savings Bank. Newspapers — Richmond Conservator, and Richmond Democrat. No regular dairies.

AGRICULTURAL PRODUCTS AND YIELD PER ACRE.

Tobacco, 1,000 lbs.; corn 40 bushels; wheat, 12½; rye, 20; oats, 50; barley, 40; flax, 2,000 lbs; hemp, 1,000; timothy hay, 1½ tons; clover hay, 2 tons.

Live stock.	Number.	Value.
Horses	8,407	$257,239
Cattle	22,118	277,146
Sheep	14,317	16,670
Hogs	58,462	102,206
Mules	3,843	147,348
Jacks and Jennets	82	5,690

Hedge fencing—Osage orange, large number of miles.

RIPLEY COUNTY.

Ripley county was organized in January, 1833. Present population, about 4,000. The soil in the bottom lands is black and rich, the upland is a clay; portions of the county are level and portions bluffy. Current river, Little Black Fachiedemauct, with other smaller streams, are our principal streams. Our mineral resources have not, as yet, been developed. We have two steam and six water mills. There are no railroads in the county. About 20,000 acres are in cultivation, valued at $100,000; the number of acres not in cultivation is about 306,063. Our farm animals are horses and mules. Doniphan is the principal town. We have no banks. There are two papers in the county.

AGRICULTURAL PRODUCTS.

Article.	Yield per acre.
Corn	25 to 50 bus.
Wheat	10 to 20 "
Rye	15 "
Oats	20 "

Live stock.	Number.	Valuation.
Horses	1,489	$36,786
Cattle	4,739	25,077
Sheep	3,521	3,437
Hogs	13,061	12,828
Mules	547	16,092
Jacks	2	150

SHELBY COUNTY.

Shelby county was organized in 1835. Present population, about 13,243. The soil is uniform in quality, and is unsurpassed for the production of general agricultural and horticultural classes, and for stock

raising, Shelby possesses some as fine farms as are to be found in the west; prairie and timber well divided. Salt, Fabius and North rivers are the principal streams; one of these rivers flows through the northern portion of the county; one through the center, and one through the southern, with quite a number of smaller streams; also, numbers of tributaries to these three larger ones. We have a limited supply of coal. There are two large, fine mills, with a number of smaller ones; one factory. We have one railroad running entirely through the county.' The county has no railroad bonds. No rock or gravel roads, but good dirt roads. There are 311,962 acres of land in the county. A large amount of stock and produce exported. We have seventy-five school houses, which cost some $65,000; also, Shelbian Collegiate Institute and Shelby high school; our school fund is little over $50,000. Bees are very extensively cultivated; the number of stands not known. Our principal towns are Shelbyville, Shelbina, Clarence, Honeyville and Bethel. Banks—Cooper & Demmette and Reed & Taylor. We have two papers in the county—the Democrat and Shelby Herald. There are two dairies.

AGRICULTURAL PRODUCTS.

Article.	Pounds and bushels.	Yield.
Tobacco	527,190 lbs.	
Corn	788,865 bus	
Wheat	9,724 "	
Rye	3,488 "	
Oats	553,875 "	
Timothy hay		21,638 tons.
Vineyards, 234		

Live stock.	Number.	Valuation.
Horses	6,156	$209,661
Cattle	17,635	231,936
Sheep	16,713	23,795
Hogs	30,215	61,027
Mules	1,880	54,202
Jacks	22	915
Jennets	45	

We have many miles of hedge fencing. No drainage necessary.

SCHUYLER COUNTY.

This county was organized in 1844, and its present population is about 12,000. The face of the county is about one-third prairie, slightly rolling; the balance brush and timber. The soil is as good as can be found in the State. Our brush land produces the best crops. Chariton river is the western boundary of the county, then the South, North and Middle Fabius creeks, running southeast through our county. Mineral resources—None, except stone coal. We have two woolen mills, one hub and spoke factory, three flouring mills and fourteen saw and grist mills. There are two railroads, eighteen miles each; no gravel roads. About 125,000 acres are in cultivation, valued at $12.00 per acre. There are sixty public schools in the county, and the school fund is $36,569.13. The principal towns are Glenwood, Lancaster, Queen City, Dawning and Coatsville. Banks—Two. Newspapers—Two.

AGRICULTURAL PRODUCTS.

Article.	Yield per acre.
Corn	38 bushels.
Wheat	18 "
Rye	12 "
Oats	38 "

Live stock.	Number.	Valuation.
Horses	3,820	$117,539
Cattle	9,805	110,260
Sheep	13,482	13,327
Hogs	19,782	32,789
Mules	441	15,006
Jacks	21	312

ST. CHARLES COUNTY.

This county was settled in 1769, organized in 1816, and reduced to its present limits in 1818, by the organization of Montgomery and Lincoln counties. Present population, about 25,000; population in 1870, 21,464. The surface of the county is alternately hilly, rolling and level, with some prairie, and abundance of timber in all parts of the county. A tongue of land, lying between the Mississippi and Missouri rivers and extending twenty miles above the mouth of the Missouri, of from two to ten miles in width, is composed entirely of alluvial soil and is, of course, remarkably fertile. A crop is almost certain, even in the most unfavorable seasons. It is undoubtedly as fertile as the valley of the Nile. The balance of the county is also of most excellent quality and well adapted to cultivation; in fact there is scarcely any land whatever in this county that will not grow a crop if properly attended to. The principal streams are Cuivre, Dardenne, Femme Osage and Peruque, with the Mississippi and Missouri rivers on the north, south and eastern boundaries. Mineral resources—Coal, limestone, sandstone and clay are found in abundant quantities. Lead and copper in small quantities around and near Hamburgh. Factories, mills, etc.—There are fifteen flouring mills, seven in county seat; one car manufacturing company in county seat employs three hundred men, whose monthly pay-roll is about $9,000, and have facilities for manufacturing about ten freight cars per day; five tobacco factories, three saw mills, one woolen mill, one furniture manufacturing company, one foundry and stove works, one gas works, one pork packing establishment, and blacksmith shops and wagon makers are to be found at every postoffice in the county and many other places besides. Railroads, rock and gravel roads—St. Louis, Wabash and Pacific, thirty miles; St. Louis, Keokuk and Northwestern, about twenty-three miles. Another projected road, running through the county, is expected to be built shortly; it will leave this county and cross the Missouri river at Hamburgh, a point in this county about eighteen miles southwest of St. Charles. We have about ten miles of rock and gravel roads. Exports—Wheat, corn, flour, hogs, bran, wine, grapes, apples, oats, hay, wool, tobacco and potatoes. We have about seventy-nine public schools in as many districts; school term averages about eight months; the school fund in all the districts is derived from the State school revenue and a small tax (from ten to

forty cents,) in each district. Besides the public schools there are many parochial schools attached to different churches, and the St. Charles College, under charge of Prof. Newland; Lindenwood Seminary, Miss Jewell, principal, and the Academy of the Sacred Heart, under the care of Mother Shannon, Superior of the Ladies of the Sacred Heart in the city of St. Charles, besides many other convents and private schools scattered through the county. At O'Fallon is Woodlawn Seminary for young ladies, under the able management of Prof. R. H. Pitman. The Mother House of the Sisters of the Precious Blood is also situated here and is undoubtedly one of the finest structures of the kind in the State. From the foregoing statement you may reasonably conclude that the coming generation will be to blame if they cannot read and write. Churches—There are eighteen protestant churches of various denominations, principally Methodist, Presbyterian and Lutheran. There are also nine Catholic churches in different portions of the county. Farm animals—Mostly common, ordinary stock, though a better grade of animals is being gradually introduced. Bee culture is not conducted on a very extensive scale, there being not over 250 stands in the county. The principal towns are St. Charles (county seat), Wentzville, O'Fallon, St. Peters, Foristell, Plantersburg, St. Paul, Augusta and Portage de Sioux. Banks—St. Charles Savings, Union Savings and First National. Newspapers—St. Charles News, Cosmos, St. Charles Demokrat and German Independent. The principal crops are corn, average per acre, forty bushels; wheat, average per acre, twenty bushels; hay, average per acre, one ton; tobacco, oats, rye, vineyards, orchards and small fruits and berries. Forest culture or tree planting—There is not any necessity for forest culture in this county for economic purpose. Hedge fencing—Osage orange principally; about 100 miles, mostly in Dog Prairie, with very good results. This county offers equal if not superior advantages to any one intending to embark in agricultural pursuits; cheap lands, low taxes, no county debt, unequaled market facilities and nearness to market. Educational and religious facilities abound. The principal portion of the foreign element of the population is German, though there are many Irish scattered through the county, and all prospering.

STE. GENEVIEVE COUNTY.

Ste. Genevieve, one of the five original counties of the State, was organized in 1803. The present population, about 10,000. The face of the county is generally broken; the soil on the hills, light clay, underlaid with limestone; in the creeks and river bottoms, heavy loam, rich and productive. The principal streams are the Mississippi on the eastern boundary, Saline, Auxvasse, Establishment, two Fouiche a Duclos and Terre Blue. The county abounds in iron, lead and copper, all of which are being developed extensively. We have eight large steam flouring mills, 10 saw mills, water mills and carding machinery. We have no railroads or gravel roads. Number of acres in the county, 304,247, valued at $1,222,061. Wheat, corn, flour, hogs, cattle, sheep, horses, tobacco, whisky, wine, fruit, hides, wool, copper, sandstone and lime are the principal exports. We have fifty schools in the county; fund not given. We have about 700 or 800 bee-stands. The principal towns are Ste. Genevieve, St. Mary, Bloomsdale, Lawrencetown and Quarrytown. Banks—Harris & James', Ste. Genevieve, Missouri. We have two papers, the Fair Play and Free Blatter, published at Ste. Genevieve.

AGRICULTURAL PRODUCTS.

Article.	Yield per acre.
Tobacco	1 hhd.
Corn	30 bus.
Wheat	12 "
Rye	20 "
Oats	30 "
Barley	20 "
Timothy hay	1 ton.
Clover hay	2 tons.

Live stock.	Number.	Valuation.
Horses	2,788	$92,562
Cattle	5,512	50,716
Sheep	4,481	4,511
Hogs	11,777	28,222
Mules	903	3,364
Jacks and jennets	10	400

ST. LOUIS COUNTY.

St. Louis county was organized in 1764. Present population, about 40,000. Principal streams, four creeks. We have 856 miles of earth roads, 155 miles gravel and macadamized, and 75 miles of railroad. The number of acres cultivated, as taken from assessor's book, 301,816, valued at $13,356,949; town lots, 3,736, valued at $1,582,503; total, $13,939,450. The number of school houses and buildings used, 115; number of persons attending school, average, 8,656; amount received from taxation and public fund, $53,502.11. We have different breeds of farm animals. Bee culture, unknown. Our principal towns are St. Ferdinand, Bridgeton, Laclede, Webster, Kirkwood, Mercer, Fenton, Georgetown, Clayton the shiretown, Carondelet, Manchester, Balwin, Chesterfield, Glencoe, St. Paul, Eureka and Allenton. Newspapers—Clayton Democrat, Star Republican and Watchers, German.

LIVE STOCK.

Live stock.	Number.	Valuation.
Horses	6,975	$239,105
Cattle	8,973	140,9[illegible]
Sheep	5,801	10,58[illegible]
Hogs	27,872	61,315
Mules, Jacks, Jennets	3,284	137,100

STODDARD COUNTY.

Organized in 1835. Present population, 12,000. The central portion of the county consists of rolling uplands, on the east and west sides of which are the bottoms of the St. Francois and Whitewood. Principal streams—Whitewater on the east, St. Francois on the west, the Castor, and several small streams. Mineral resources—None developed. The soils of the bottoms are a sandy loam of great fertility, well suited for cotton; upland, clay soil, adapted to wheat. There

are four or five mills in the county. The Iron Mountain railroad runs through the county from east to west, a little south of the center. Number of acres cultivated, 50,000; not cultivated, 30,000. Exports—Cotton and wheat. The county is divided into sixty-three school districts, and in each one a school is taught. Farm animals—Many of the farmers are bringing a fine grade of stock into the county. Bees are cultivated to some extent, and do well. The principal towns are Bloomfield, the county seat, Princetown, and Dexter. Newspapers — Vindicator, at Bloomfield, and Enterprise-Messenger, at Dexter. The dairy business has not been entered into much.

STONE COUNTY.

Organized in the year 1851. Present population, about 4,000. The face of the county is mountainous. Principal streams—James Fork of White River and White river. There are four grist mills and three saw mills. Number of acres cultivated, 17,854, valued at $4.00 per acre; not cultivated, 53,562 acres, valued at $3.00 per acre. Exports—Corn, wheat and oats. Number of schools, 24; amount of school fund, $3,326.75. Farm animals—Work stock, 2,310 head. Number of bee-stands, twenty-five. Galena is the principal town, and there is only one newspaper printed in the county. Number of milk cows, 2,325.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	100	400 lbs.
Corn	7,951	25 bushels.
Wheat	5,368	10 "
Rye	50	8 "
Oats	1,785	26 "
Barley	25	30 "
Timothy hay	1,000	2 tons.
Clover hay	500	2 "
Orchards	980	

Live stock.	Number.	Value.
Horses	1,485	$32,[illegible]
Cattle	3,467	24,[illegible]
Sheep	3,746	3,[illegible]
Hogs	8,681	9,[illegible]
Mules	245	8,[illegible]
Jacks	9	[illegible]

SULLIVAN COUNTY.

Sullivan is in the fourth tier of counties west of the Mississippi river and in the second tier south of the State line of Missouri and Iowa. Milan is the county seat, is in the centre of the county, a distance of 110 miles west of Quincy on Burlington and Southwestern Railway, and on the line of the Quincy, Missouri and Pacific Railroad; about 260 miles from St. Louis; less than 125 miles from Kansas City and 148 miles from Burlington, Iowa.

The county presents a diversified surface, being interspersed with alternate bodies of timber and prairie, running north and south. It has as beautiful prairies, as can be found anywhere, generally undulating, while near the streams they are slightly broken. The timber belts are covered with all the usual varieties found in this latitude, including cottonwood, elm, walnut, hackberry, linden, sugar maple, hickory, etc. All the considerable streams in the county have their general courses north and south. One of the largest streams is called Locust or Main Locust. It passes through the county about two miles west of Milan, rising up in Iowa. East Locust passes by Milan, just to the east, skirting the town limits, and forms the bed road for the B. and S. W. Railway nearly the entire distance through the county. West Locust passes through the county about six miles west of Milan, and traverses the entire distance of the county. On the western borders of the county is a creek called Medicine. It traverses about three-fourths the distance through the county. On the east side of the county, the principal stream is Yellow creek, about six miles east of Milan, which also traverses the entire distance through the county; and on the eastern border is Muscle creek, which traverses over half the distance of the county, or the southern portion, while Spring creek passes through a large portion of Buchanan township, from northwest to the southeast

All these streams have large bottoms, which are noted for the richness of their soil, and frequently extend for miles parallel with the course of the stream, perfectly level, and from a half to a mile and a half in width. Most of these unsurpassed bottom lands are yet uncultivated, and can be purchased at very low figures. Much the greater portion of it is prairie, while close by the streams it is covered with a rich growth of the usual varieties of timber.

TANEY COUNTY.

Settled in the year 1827. Present population, 5,230. Face of the county—Rough and mountainous, interspersed with rich valleys; bottoms, a rich sandy loam with sand subsoil; uplands black and rich with a clay subsoil. Principal streams—White river, (navigable for boats,) Beaver, Swan, Bull, Bear, Big Shoal, Bee, Silver, Turkey and Long. Mineral resources—Lead and iron, (undeveloped). There are 4 grist and flouring mills, 1 saw mill and 5 cotton gins. Railroads, etc.—None. Number of acres in cultivation, 36,914. Number of acres not cultivated, 30,915; there are also several thousand acres vacant. Exports—Cotton, tobacco, wheat, flour, beef, pork, etc. There are 50 schools in the county, with $2,000 funds for annual distribution. Farm animals—Horses, mules, cattle, sheep and hogs. Bee culture—Very little attention given to bee culture; there are about 200 stands. Principal towns—Forsythe and Kirbyville, both small villages. Banks—None. Newspapers—The White River Herald.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Tobacco	500	800 lbs.
Corn	15,000	30 bushels.
Wheat	5,000	10 "
Rye	500	
Oats	5,000	
Timothy hay	800	1 ton.
Clover hay	50	1 ton.
Vineyards	20	
Orchards	500	
Small fruits and berries	100	
Cotton	9,949	800 lbs.

Live stock	Number.	Valuation, per head.
Horses	1,851	$23 [illegible]
Cattle	4,237	6 [illegible]
Sheep	3,275	1 00
Hogs	11,216	1 00
Mules	415	23 00
Jacks	8	40 00
Jennets	8	10 00

Forest culture or tree planting—None. Hedge fencing—None. Land drainage—None.

TEXAS COUNTY.

Organized in 1845. Present population, 10,000. Face of the county is broken; rich valleys with good timber, and the ridge land has a very good mulatto soil, good for wheat and grass. Principal streams—Roubidoux, Boone, Arthies, Jack's Fork of the Current river, and Brushley. Mineral resources—Prospects are good, but as yet have not been thoroughly developed. There are no factories but several mills. Railroads—None. Number of acres cultivated—About one-fifth of the whole county, or 140,000 acres. Number of acres not cultivated, 560,000. Exports—Cattle, hogs, mules, horses, wheat and tobacco. There are about 90 public schools in the county. Farm animals—Mules, horses and oxen. Bee culture—There are several stands in the county. Principal towns—Houston, Licking, Plats and Summerville. Newspapers—Houston Democrat and Houston Herald. Number of milk cows, about 4,000.

AGRICULTURAL PRODUCTS.

Article.	Yield per acre.
Tobacco	700 lbs.
Corn	40 bushels.
Wheat	20 "
Rye	30 "
Oats	50 "
Timothy hay	2 tons.
Clover hay	2 tons.

Number of horses, mules, cattle and hogs, very large in the county. Sheep—Not so many. Jacks and jennets, very few.

Forest culture or tree planting—None. Hedge fencing—None. Land drainage—None.

VERNON COUNTY.

Organized February 19, 1855. Present population, 16,000. The face of the county is level, and the soil good limestone and sandstone. Principal streams—Marmaton, Clear creek, Drywood and Little Osage. Mineral resources—Coal and lead, and there are two potteries in full blast. Factories, mills, etc.—Three mills and one factory. Railroads—Missouri, Kansas and Texas, thirty-nine miles. Number of acres cultivated, 100,000, valued at $7.00 per acre; not cultivated, 428,984. Exports—Corn, castor beans and flax seed. Amount of school fund, $80,000. The principal towns are Nevada and Schell City. There is one bank in the county, and two newspapers, Democrat and Ledger.

AGRICULTURAL PRODUCTS.

Article.	No. acres.	Yield per acre.
Corn	65,000	35 bushels.
Wheat	20,000	13 "
Oats	5,000	20 "
Castor beans	1,000	5 "

Live stock.	Number.	Value.
Horses	7,484	$201,726
Cattle	34,050	828,829
Sheep	13,104	13,688
Hogs	32,189	37,710
Mules	1,963	67,109
Jacks	24	800
Jennets	16	252

WARREN COUNTY.

Organized in January, 1833. Present population, about 10,450. The southern part of the county consists of river bottom and bluff land, and the northern part of prairie. Principal streams—bounded on the south by the Missouri river, the tributaries are Tuque, Charette, Bear, Big, Lost and Camp creeks. Mineral resources—Stone, coal and marble, quarry not worked. Factories, mills, etc.—Nine grist and saw mills, one plaining mill, two wool carding mills, one tobacco factory, one wagon factory, nine on a small scale, eight shoe factories, and fifteen blacksmith shops. Eighteen miles of railroad. Number of acres cultivated, estimated at 129,693; not cultivated, 129,693. Exports—Wheat, corn, oats, barley, tobacco, potatoes, timothy hay, flax, fruits. Educational facilities—There are fifty-five public schools in the county, and the school fund amounts to $17,817.00; two private colleges and one German school. Farm animals—A variety of breeds. The principal towns are Warrenton, Wright City, Pendleton, Marthasville, Hopewell, Holstein and several other small places. Banks—Warren County Savings Bank. Newspapers—Warrenton Missouri Banner and Warren County Citizen.

LIVE STOCK.

Live stock.	Number.	Value.
Horses	8,021	$93,600
Cattle	10,415	78,765
Sheep	6,414	6,555
Hogs	26,174	87,540
Mules	1,813	69,995
Jacks and Jennets	10	400

Hedge fencing—Osage orange; number of miles not known. Land drainage—Private; results good.

WASHINGTON COUNTY.

Organized in 1815. Present population, 15,000. Face of the county and quality of soil—Some valley; mostly broken and hilly; one-fourth fertile, rich farming land, the remainder is first class grass land; clay subsoil, and cannot be excelled for natural grazing. Principal streams are Big river, Mineral Fork, Forch au Renault, Mine au Breton and Indian creek. Mineral resources are lead, iron and zinc. Factories, mills, etc.—Saw mills, lead furnaces, iron furnaces, one cheese factory, one zinc factory, one tannery, one bucket factory and flouring mills. There are 24 miles of railroad. About one-seventh of the acreage is cultivated, and is worth from $10 to $30 per acre; there are about 76,000 acres not cultivated. Exports are lumber, lead, wheat, zinc, wool, tobacco and cheese. There are 60 public school houses and one college, and $34,000 in school fund. Farm animals, variety of breeds and amount of work stock—3,000 work horses and mules; cattle, Short-horns and Jerseys; hogs, mostly Berkshire; mostly Cotswold sheep. 500 bee-stands. The principal towns are Potosi, (county seat,) Caledonia, Mineral Point, Irondale and Hopewell. One newspaper. Dairy products—Cheese and butter; number of cows not ascertained.

AGRICULTURAL PRODUCTS.

Article.	Yield per acre.
Corn	20 to 70 bus.
Wheat	10 to 30 bus.
Oats	20 to 45 bus.
Timothy hay	1 to 2 tons.
Clover hay	2 to 4 tons.
Vineyards, 25.	

Live Stock.	Number.	Valuation.
Horses	3,116	$100,910
Cattle	8,043	64,975
Sheep	6,043	6,130
Hogs	14,709	18,005
Mules	1,447	47,700
Jacks	10	1,200
Jennets	15	600

WORTH COUNTY.

Organized in 1861. Present population—There are nearly 9,000 people, 85 per cent. of whom hail from the States of Pennsylvania, Ohio, Indiana, Illinois, Wisconsin, Kentucky and Iowa, and represent the full average of brains, culture, enterprise and morals of the lands from which they come.

ITS PHYSICAL FEATURES.

The face of the county is beautifully undulating, and the prairies stretch out in gentle, regular slopes, sufficiently rolling to afford complete natural drainage. The soil is singularly exempt from the effects of either drouth or continuous rains, and is unsurpassed as regards fertility, as is amply shown in the luxuriant growth of native grasses and other vegetation. The upland prairies produce immense crops of grass, and thousands of cattle are annually herded and fattened for market without the use of any other food. The river valleys are alluvial deposits, very productive and easily cultivated. About one-fifth of the county is timbered with oak, walnut and hickory, while the rivers and streams are lined with a heavy growth of cottonwood, linden, elm, maple and ash, thus furnishing an abundant supply of fuel, fencing and building material, so admirably distributed that every farm is within convenient distance of choice timber. Some of the finest groves of white oak timbers to be seen anywhere in Northwest Missouri are found in this county, and are quite extensive, varying in width from a half to two miles, and reaching nearly across the county in length.

Principal streams are Platte and Three Grand rivers. Mineral resources—None developed. There are 10 or 15 flouring and saw mills. Railroads, rock and gravel roads—None. Our prospects are excellent for two railroads through our county next year. There are 75,000 acres under cultivation, and 100,000 acres not cultivated. Exports are corn, wheat, cattle, horses, mules, hogs, etc.

Have built 60 comfortable school houses, and have upwards of 3,000 pupils enrolled; have a permanent, inalienable school fund of $50,000, which is being steadily augmented by public fines and penalties, and vote special taxes for the popular education as freely as if individual culture were the only purpose in life. This observance of law and order, their refined and well ordered society, is not excelled by that of any other community.

CLIMATE.

The climate is remarkably healthy. There is almost an entire exemption from malarious diseases. This is doubtless due to the fact that the county lies along the headwaters of the Platte and Grand rivers, where the bottoms are narrow, and has a sufficiently high and undulating surface between the streams to cause the water to run off rapidly. Springs of excellent water are found everywhere, and a pure, dry and bracing air sweeps at all times over the county. Plenty of good, pure water can be had in abundance everywhere in the county by digging from 10 to 40 feet.

Farm animals—Horses and mules. Principal towns are Grant City, Allensville and Denver. Banks—One. Two newspapers, the Times and Star.

AGRICULTURAL PRODUCTIONS.

The great staple crops of the West—wheat, corn, oats and rye—form the bulk of the products of this county, and are so successfully and profitably raised that the majority of the farmers have not attempted other crops.

Article.	Yield per acre.
Corn	40 bushels.
Wheat	15 bushels.
Rye	15 bushels.
Oats	30 bushels.
Flax	12 bushels.
Timothy hay	3 tons.
Clover hay	4 tons.
Timothy seed	8 bushels.
Clover seed	5 bushels.

Live Stock.	Number.	Valuation.
Horses	4,182	$120,168
Cattle	13,450	147,303
Sheep	5,925	6,013
Hogs	24,286	26,740
Mules	585	18,854
Jacks	24	536

Sugar Cane Culture.

ST. LOUIS, May 13, 1880.

To the honorable State Board of Agriculture:

GENTLEMEN: In compliance with your request, as communicated through your Secretary, I have the honor of submitting the following paper as embracing some of the leading principles and practices to be observed in the development of the new sugar industry that is now claiming the earnest attention of the people of our whole country. In preparing this paper for your report I shall present it more as a compilation of what I have heretofore written, than as entirely original matter. This results from a necessity growing out of my having been called upon so frequently to write upon this subject of cane culture and sugar making, that I have already covered nearly the whole ground. To be most useful in a work like a State agricultural report, the subject should be treated in a plain, practical manner, and in that sense it has ever been my purpose to consider the subject. It gives me great satisfaction to lend my feeble efforts in this direction. The position in which circumstances have placed me, has afforded me ample opportunity to learn the pressing necessity for the adoption of the measures embraced in this movement of your honorable body. If you could glance over the files of the correspondence that has poured in upon me as an officer of the Cane Growers' Association, and there learn the clamor for information welling up from every county and town in the State, as well as the surrounding States, your zeal would be awakened to a still higher degree. The lack of such skill, as is within the power of the State, through its institutions, to impart to its citizens, will not only assist to directly increase the revenues, but save a great loss to the people from misdirected efforts. If it is wise to improve the navigation of rivers, build railroads and thoroughfares by the State for the transportation of produce, it is equally so for the State to educate the people in the best methods of increasing the productions of the State. It is in this view of the subject that I congratulate the people of this State upon the action of your honorable board. My views addressed to the late Immigration Convention, being pertinent to the subject, I give them place here, as follows:

Northern cane culture is the subject assigned me for discussion, by the Missouri Emigrant Society on this occasion. The term, northern

cane, attaches to that species of cane commonly called sorghum, or as classified by Linnaeus, Holcus Saccharatus, while the southern cane is Saccharium Officurarium, by the same botanist. These two canes differ greatly in their vegetating capacities. While the latter is barely susceptible of maturing in our most southern latitudes, the earlier varieties of the former will mature in our most northern and in the south rattoon, and mature a second and third crop the same season. Therefore, we term it northern cane, because of its capabilities of northern as well as southern culture. It may with propriety be called a universal cane, although it had its origin in latitude 31 deg., it has been acclimated and so changed in its character, since it has come into our possession, that it will hardly be recognized by those of its first observers. It is not my purpose to occupy the attention of this assembly with a detailed history ot this cane, now claiming so much attention by the people of this whole country.

If you will place the map before us, and in our mind's eye set down the one point of the divides at St. Louis, and then sweep with a circle of five hundred miles around this city, you will have encompassed an area of country that cannot be duplicated on this habitable globe. And here, in the centre, we find Missouri and St. Louis.

Over forty years have passed since I first became one of its citizens, and it gives me great pleasure to meet on this occasion this vast assemblage from all parts of the State to bear witness to the great riches that are in store in her domain. We have only to apply our minds and muscle to secure it. Occupying a midway position between north and south in this great valley, we become the radiating point and rallying ground for every great and good work. This is especially the case with that industry which I in part represent on this occasion. These few samples are before you as finger boards, pointing out the way for the emigrant to the inexhaustible saccharine mines of Missouri; this points you to Harrison county, that to Cooper county, this to Jackson, that to Cape Girardeau, and I could add many others.

In all these we see reflected the significant fact that all Missouri is susceptible of producing an abundance of sugar. That such samples as these should have emanated from these various sources from among farmers, without the skill that is so essential in working the canes of the tropics, is to us an additional finger board in our pathway.

By the communications I receive from all parts of the State, I find the crop quite as reliable as corn, in fact, I cannot hear of a failure. Mr. A. S. Edson of Brooklyn, Harrison county, who made one of those best samples, writes me thus:

BROOKLYN, Mo., April 3, 1880.

Mr. J. A. HEDGES: Seeing some questions in the Rural World that you wished answered in reference to sorgo cane culture, I reply as follows, in addition to my letter of March 26th, on the subject:

1. How does cane succeed in your county? Reply—We invariably raise a fair crop.

2. Have you ever known it to fail when corn succeeded? Reply—It has not failed in the past thirteen years that I have been in Harrison county.

3. What soil does best? Reply—High, dry and sandy soil; soil that is well worn, and has not been fresh manured, makes the best syrup.

4. Is the syrup generally used by the people when they can get it? Reply—Nearly universally.

5. What is the disposition in favor of increasing culture? Reply—It is that we ought and can produce our own sugar and syrup.

6. Is the forage part of the crop desirable for stock, and how does it compare with corn, oats and hay, acre for acre? Reply—We think it is, though we have not had much experience in feeding it, but we think it would be as good, if not better than oats, acre for acre.

A. S. EDSON.

And also the following from Mr. G. W. Allen of Jackson county, Missouri, whose superior sample of Early Orange cane sugar is here before us, which is fully equal to vacuum boiled plantation sugar and polarize at 97½ per cent. pure, this sample, upon close examination, will be found free of that gumminess generally present in most of these sugars.

WESTPORT, Mo., April 12, 1880.

Mr. J. A. HEDGES: I have the satisfaction of sending to you some samples of sugar swung out this morning in one of your hand centrifugals, from syrup of a variety of cane grown by one of my patrons, the name of which is not known here. It was boiled in open pan, or rather an evaporator of my own construction, which secures a degree of defecation before active boiling commences.

No chemical or reagents whatever were used, and the molasses that swung out was of a very superior quality. I noticed that granulation commenced immediately after leaving the evaporator, although it was only boiled heavy enough for good syrup.

Yours truly,

G. W. ALLEN.

This northern cane is not only thus reliable as an annual crop, but it has baffled the ravages of that devastating scourge, the grasshoppers, at least so far as I have been informed. I will, however, make the inquiry from the delegates here present, and pause for reply. Any one from those districts visited by the beetle, growing the cane, can serve the common interest by responding.

This settles an important question, and places this industry on a reliable basis, unequaled by any crop we have, so far as its production is concerned. That the methods of culture are imperfect, is most probable, and must so continue until our farmers have met with failures in the essential outcome—that of financial success. When the increased

productions shall be such that the syrups and molasses are so abundant that the prices fall below remunerative rates, then the producers will of necessity study more closely the better methods of culture by which to secure paying results. This matter is now agitating the minds of the sugar planters of Louisiana, who are fertilizing their lands in many cases by sowing the Carolina cow pea, and turning it under the same as we in the North do the clover. This subject of fertilization, I trust, will receive careful consideration when our Agricultural College shall embrace this cane as a crop worthy of the States' patronage.

Then we may hope to see the annual reports of our State institutions replete with valuable information, and facts based upon practical and scientific experiments, that shall afford the farmer a reliable guide for his own operations.

This business partakes of and involves more largely the principles of science than most other crops upon the farms of our country, and, therefore, we have invoked the assistance of the State in our behalf, and I am pleased to be informed that our invocation has been heard.

Our State Board of Agriculture, at its late meeting, in response to the urgent suggestion of President Laws, has adopted measures for embracing this industry as one of the departments of the agricultural school of our State. By appointing a committee to take the initial steps for the manufacture of sugar in connection with the Agricultural College.

This movement of our worthy citizens places our State in the lead, and, occupying as we do the central position in this great valley, having already in successful operation one of the largest and most successful sugar refineries in the State, capable of refining 300,000 pounds of raw sugar per day, an establishment whose sugars have never been subject to the charge of adulteration—this affords us a sure home market for our surplus productions of raw sugar. I may be excused, if I express in this place, my thanks, and also the friends of this industry, for the facilities afforded us by the managers of the Belcher Sugar Refining Company at St. Louis, in the efforts that have been made here to foster this new source of wealth, unlike the works of the East, the strings of their latch have not been pulled in.

I may add, that it is the sugar outlook that is alone interesting to refiners, as the process of refining will afford all the syrups needed to supply their trade; therefore, our friends must generally look to the country for a market for theirs. Although it cannot be expected that in an address of this character a treatise of instructions would be in place; nevertheless, owing to the close proximity of the planting season, I will venture to advance some few practical hints and suggestions upon the culture of this important crop.

First, in the selection of soil, that of a calcareous composition and of natural drainage will be found best adapted; when lime is not present in the soil, it may be beneficial to add it in the process of culture.

It is better to use gypsum, phosphates, or even quick-lime, than fresh manure, possessing ammonia as a fertilizer.

There is no plant more susceptible or sensitive to fertilizers than these sorghums. Hence the juice from the low, rich bottom soils, where the canes will grow to enormous size, will seldom attain over 7 degrees Reaum. When boiled to a syrup without the addition of a large quantity of lime to react the acid, the syrup will be tart, and offensive in taste and odor, and when neutralized it will be dark and still unpleasant. The same varieties produced in a yellow clay and loam, like that of farmer Schwarz, of Madison county, Ill., or Mr. Edson, of Harrison county, Mo., whose samples are before us, the juice will range from 10 to 15 degrees, as was the case with the Early Orange the past season. The benefits, realized from a richer juice, are not alone in the quality, but in the injury the inferior receives from the longer exposure to heat and the atmosphere during the process of manufacture, besides the use of all reagents are more or less detrimental. This suggests the importance of employing a soil that may incorporate all the elements in the cane requisite to the production of sugar, by the simple application of heat to evaporate the water. It is to this point I would most earnestly direct the attention of the cultivator.

VARIETIES OF CANE.

Sugar making being the objective point, we must select the cane best adapted to that end. It will be found that it is not so much the variety as the quality of juice the cane yields. The juices of all canes grown in the favorable soils and marking above 10 degrees B., will, when fully matured and correctly worked, make sugar; and the higher the mark the better the result. At present the variety known as the Early Amber, is most noted for its sugar making qualities, although it will be improved by careful attention to culture. It is a cane of earlier maturity and less size than any now being cultivated, except the Nee-a-za-na, which is not much cultivated. The Early Orange, that has been recently brought to notice, has much to recommend it.

First—Being richer in saccharine.

Second—More vigorous growth, and may, therefore, give a larger yield of juice. Its sugar making qualities may be considered rather superior, from the evidence thus far received. The tests to which we are subjecting it this season will demonstrate its full merits. The Honduras, so called, is one of the varieties of the African imphees

iat has maintained its identity closely. It should be called E-enga, s original Zulu name as given by Wray. This variety is too late to e relied on, even in the latitude of St. Louis, and of its sugar making ualities I am not justified in speaking decidedly favorable. Being a ate cane, it may not have been allowed to fully mature. On this point ve shall be favored with more reliable reports this season, as it will be ultivated as one in the rotation of crops for working in the hands of parties well qualified to test its merits, as well as other varieties named. By planting these three varieties in those districts south of St. Louis, the season may be prolonged, and thus more fully realize the value of the expense of fitting up.

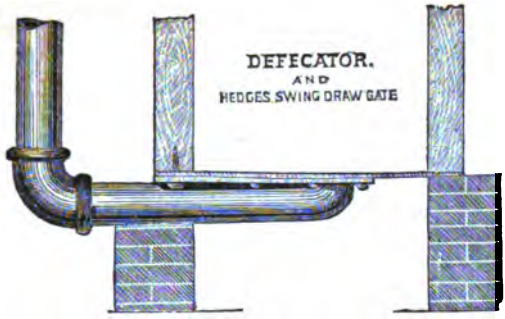
Now, in conclusion, I wish to address myself especially to those delegates here present, touching this industry. It is not necessary for me to say more in proof of the reliability of this crop in all parts of this State, but a few words as to how we shall proceed to realize the desired results when adopted, may not be inappropriate on this occasion. You will please bear with me while I appeal to you, gentlemen, as an old pioneer in this industry, for which I have stood its advocate when it was divided, sneered at and scouted as another humbug to fleece the farmer, and now when we find the pure gold in the crucible, the agricultural community are excited by these evidences, to such a degree that it taxes my utmost efforts to prevent those, who but yesterday sneered at it, from diving headlong into the production of a crop they have not the skill to work up. Then the question comes up, what is to be done? or what shall we do to be saved? I answer, educate the people, teach them in all the departments, from the seed to the sugar bowl.

For what have we an Agricultural College? Simply to grow corn, wheat, potatoes, cabbage and squashes, and no sugar? No, gentlemen. I feel the negative throb from each mind in this assembly, which I will venture to interpret, thus show us that our agricultural school can teach our sons and daughters to make such sugar as this before us. We will cheerfully lend that school our most hearty support. This brings us to the point on which I ask your most earnest attention. Go with me and view that college farm, the soil of which is, in my judgment, well adapted to this northern cane, as well as the farms adjoining. Then why not demand of the next Legislature a sum sufficient to establish these works—complete model works—sufficient in all its appointments to not only teach, scientifically and practically, this business of sugar making, but yield a revenue by working up the cane of the surrounding farms, and thus, while they are educating those students, you require them to work out their own salvation. This view of the business

I am pleased to know meets the approval of the State Board a Faculty, as well as the good citizens of old Boone. I am now parti larly desirous of presenting this before you, gentlemen, because y are representative men of the State, and probably many of you m soon be called upon to entertain this subject in a legislative capac and as it is an old proverb, that, with the agitation of thought is t beginning of wisdom, therefore, I desire to loose no time or occas wherein I can agitate the desired thoughts.

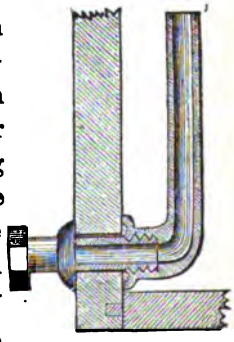
In conclusion, Mr. President and gentlemen, allow me to that if my few last years of labor shall be in any way conducive to attainment of that cherished object of mine for which I have b seeking earnestly for twenty-four years, viz.: the development of a g eral crop of easy culture, out of which our own people can mak supply of sugar, syrups and molasses. This accomplished, and the pioneer will lay by his pen and tools with a satisfaction only known himself and contemporaries.

You will please allow me to call your attention to the crying cessity of our State Institution under your supervision keeping p with the age. This, gentlemen, cannot be accomplished without bring to your aid all those discoveries and improvements that are eve where acknowledged of great practical importance. In the establi ment of suitable works to render this sugar-making industry a succe ful school and self-sustaining, the employment of a good steam gine and boiler will be a necessity, and its uses will not be confine this business. This State is a great stock-growing State, and upon College farm there should be established the most complete range stalls, supplied with selected stock, whose food could be ground prepared by the agent of all work—steam. The offal of the su cane crop, consisting of seed, foliage and scum from the sugar hous ample to feed to full satisfaction four head of large, neat stock per e acre through the season; or, if fed to swine, an equal benefit may realized from the seed ground and mixed with the scum while hot, a feed daily before fermentation ensues. In order to utilize the c sheds they may be closed up and converted into cattle stalls for t winter, while a portion of the sugar house may be employed as a m house for grinding and preparing food for the stock, and in this ma ner teach the student as well the manipulation of steam engines a feed preparing, as that of the other departments of agriculture.



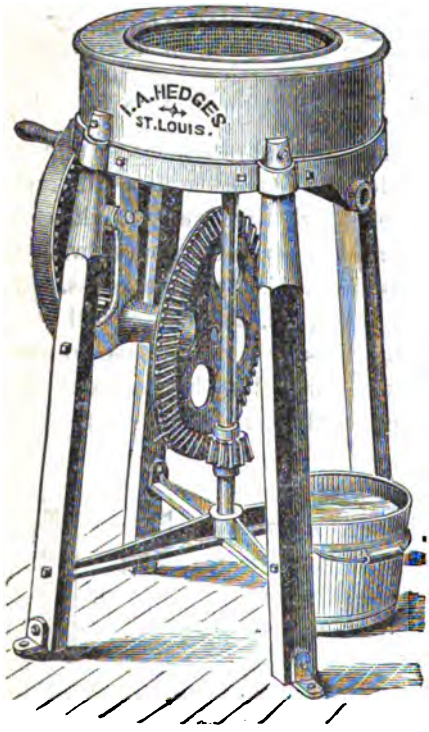
The above is a sectional cut illustrating a defecator, set upon a furace with a swing draw-gate secured to the underside of the pan, with long opening that will admit a free flow from the bottom of the same, nd thus enable the operator to decant his juice and leave his scum ehind in the pan; then by turning the swing section over in the opposite direction and dashing a few gallons of water into the scum, run t out into its proper receptacle, using some sweep to expedite its discharge; when the same is complete, raise the swing upright and hastily eplenish the defecator. In order to protect the thin bottom of the pan during the strike, the furnace may be crammed with green begasse, made wet, if need be, with water. This pan, thus employed, will perform the work of defecation more nearly like that of a steam coil than any yet offered for fire pans. In working this, the pan may be filled from six to twelve inches deep, according to the magnitude of operations. The juice should be treated with lime before entering the pan. The use of the proof glasses will be found indispensable in this work to determine the progress of defecation.

This cut illustrates the proof glass around the neck, of which attach a wire or cord and drop it quick to the bottom to fill, and then hang it up, and observe whether there are present flakes of feculence that precipitates, and, after a few minutes, repeat with a second glass and compare, and thus determine your success. It may be well to vary the fire by open doors, etc. To acquire full success, each new beginner must watch closely every phase of the work, and take note of each indication, and thus become expert. A person may commit the gammet perfectly, but be unable to sing without some practice.

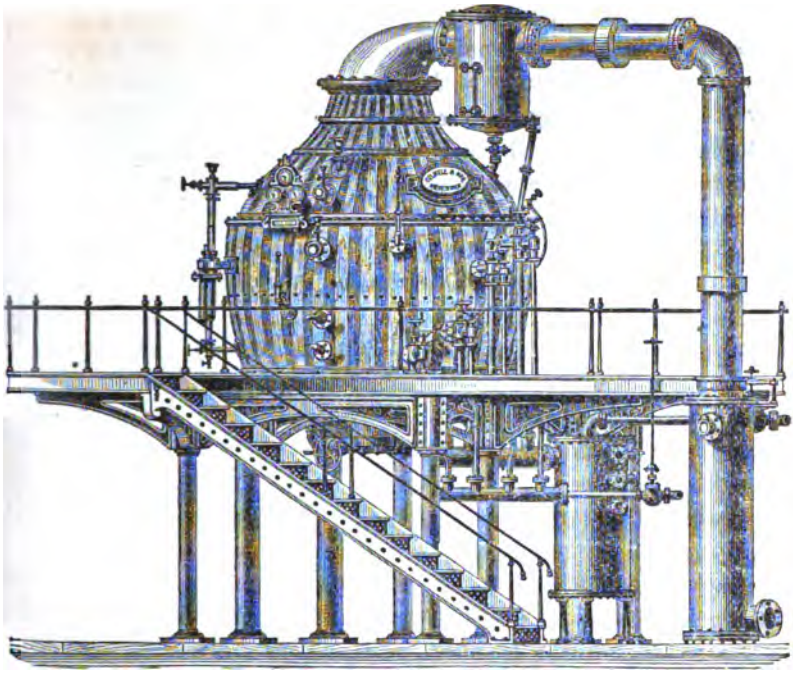


This is a representation of a part of a settling tank into which the defecated juice is drawn and allowed to rest for a few minutes, when a settling will take place as seen in proof glasses. Then by means of the swing pipe that has an out-let near the bottom, but the inlet at the top of the swing section, which is on the inside in this case, hence the draw commences at the top, taking the clear juice and discharging into the evaporator, which should be of the capacity to work up or inspissate and draw the tank empty while the next batch is preparing, and thus keep the works running regular.

The use of thermometors in boiling will be to a sugar boiler what a rule is to a carpenter, that is, enable him to finish his batch without guessing, and for that purpose it should be placed in the boiling syrup where it is a fair test of the whole batch, and then be closely watched as the batch thickens. The saccharometer is principally useful for determining the richness of cold juice, as the sweeter it is the heavier, and may serve to determine who brings the best cane to a mill, or what soil produces best. Though this does not settle definitely the presence of cane sugar to the degree shown, but still, is a fair presumption of that quality, and sufficiently close for such preliminary operations. In testing syrup that is hot, four degrees must be allowed, thus, syrup of thirty-six degrees B. will be forty degrees when cold, and will be found good quality for market, provided it has been properly treated with lime, otherwise it will need boiling higher to prevent fermentation in hot weather.



This cut represents a hand centrifugal, which is the same in form as the power machine, only differing in size and provided with pulleys. These, as will be seen, are simple, and, though small, serve the purposes for all the ordinary operations in these early days of this industry. The hand machine, weighing 200 lbs., and the second size, one for power, some 300 lbs., and ample for a crop of 100 acres, while the former will serve for 50 acres and under. The methods of working are simple, and can be performed almost by any hand. The molasses swung from the sugar will be found equal to the best New Orleans, and preferable for table use. In those establishments using vacuum pans, the molasses can be reboiled and a further granulation obtained, making what is termed second grade sugar. This second boiling will become necessary where washing the sugar in the centrifugal is employed, because the molasses will thus be diluted and may ferment on the hands of the consumer.



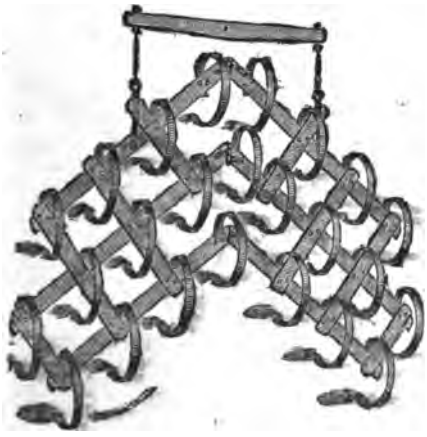
VACUUM PAN.

I have had so many inquiries about vacuum pans in connection with this new sugar making industry, that I have obtained an electrotype from one of the manufacturers, for whom I am soliciting orders. The above cut represents one set upon iron pillars. They are made of various sizes and prices. The elevation of the pan should be sufficient to discharge the strike into the centrifugal mixer. By this it will be seen that by this system of boiling the crystals are formed in the vacuum pan, where the heat is not above about 140 degrees Fah., while in the open pan it would run up to 234 degrees in this latitude. The vacuum is produced by means of pumps and a condensation of the steam with jets of cold water. The cane juice has first to be thoroughly defecated and clarified before entering the vacuum pan, as no scum can be removed from it after entering. There are efforts making to construct pans having vacuum effect and facilities for removing the scum also. Should this be successful, without danger or too much expense, it will prove of great benefit to the business. The fact is, the opening up of this industry is stirring up the inventive genius of this universal Yankee nation, and it will be strange indeed if some new departures are not forthcoming.

It is hardly probable that more vacuum pans will be set up for this crop this season, as there seems to be great confidence in obtaining good results from open pan boiling. Then there are many more efforts to be made in the culture with a view to the production of a better quality of juice. Nearly all our western agricultural colleges have applied to me for seed of all the approved varieties. Hence we may expect something from that source.

APPENDIX.

The Spring Tooth Harrow, from C. A. Crosby & Co., Kansas City, has been tested in part, (it was received late in the season,) and has proved a very efficient instrument, especially in rough and stumpy ground. The spring teeth readily clear themselves from stumps and other obstructions, and at the same time stir the soil close up to the stumps and rocks in its passage over and around them. We have also used it in cultivating young corn with marked success.



FARM IMPLEMENTS TESTED.

The Potato-bug Exterminator, manufactured by S. H. Fox, 1225 North Fifth street, St. Louis, has been thoroughly tested, and it has proved a very cheap, safe and efficient exterminator of all the insects of the farm and garden.

The Gale Chilled Plow, manufactured by the Gale Manufacturing Company of Adrian, Michigan, has proved an excellent implement. It is very durable, (nearly all iron and steel,) has a light draft, runs steady, and pulverizes the soil more perfectly than any plow used on the farm the past year.

G. C. SWALLOW,
Dean Agricultural College.

XII. AGRICULTURAL AND MECHANICAL COLLEGE.

FACULTY.

SAMUEL SPAHR LAWS, LL. D., PRESIDENT,
Professor of Sciences of Mind.

GEORGE C. SWALLOW, LL. D., DEAN,
Professor of Agriculture and Natural History.

JOSEPH G. NORWOOD, LL. D.,
Professor of Physics.

JOSEPH FICKLIN, PH. D.,
Professor of Mathematics and Astronomy.

CONRAD DIEHL,
Professor of Art.

PAUL SCHWEITZER, PH. D.,
Professor of Chemistry.

DAVID R. McANALLY JR., A. M.,
Professor of English.

THOMAS J. LOWRY, S. M., C. E.,
Professor of Engineering.

S. M. TRACY, S. M., (Mich. Ag. Col.),
Professor of Entomology and Economic Botany and Superintendent of Gardens.

GEORGE HUSMANN,
Professor and Superintendent of Pomology and Forestry.

ROBERT B. MADDEX,
Farm Superintendent.

WM. A. CAUTHORN, A. M.,
Assistant Professor of Mathematics.

HON. JOHN WALKER, JOHN S. CLARKSON, HON. JERRE C. CRAVENS,
Farm Committee.

The Board of Curators announced "a full course of lectures on Scientific Agriculture, by Prof. Swallow," in the year 1859, (Cat. 1859, pp. 26-27,) and in 1870, this Department was revived and reorganized, upon the basis of the Congressional land grant of 1862, and has, from its reopening, been in charge of Prof. Swallow, who was first entrusted by the Curators with this line of work twenty years ago.

COURSE OF STUDY.

The following revised course of study has been adopted by the Faculty of the Agricultural College:

First Semester.—Arithmetic, United States History, English Grammar and Language Lessons, Reading, Penmanship and Orthography.

Second Semester.—Arithmetic and Book-keeping, Analysis and Rhetoric, Botany and Drawing.

Third Semester.—Algebra, Political and Physical Geography; Horticulture, Pruning and Training; Soils—Formation and Ingredients, Classification, Tillage and Fertilizers; English and American Literature.

Fourth Semester.—Horticulture, Gardens and Gardening, Floriculture and Transplanting, Political Economy, Elocution and Themes, Landscape Gardening, Ornamental Trees and Shrubs.

Fifth Semester.—Horticulture, Pomology and Forestry, Ornamental Trees and Shrubs, Physics, Chemistry and Laboratory work, Ethics and Drawing.

Sixth Semester.—Physics, Geometry, Laboratory work in Qualitative Analyses, Horticulture, Entomology and Economic Botany.

Seventh Semester.—Trigonometry and Surveying, Human Anatomy and Physiology, and Zoölogy, Mineralogy and Palæontology, Agriculture, Domestic Animals.

Eighth Semester.—Chemistry and Laboratory work in Quantitative Analyses, Agriculture, Farm Architecture, Farm Machinery, Mechanics.

Ninth Semester.—Agricultural Chemistry, Psychology and Logic, English History, Agriculture, Veterinary Science, Farm Crops.

Tenth Semester.—Spherical Trigonometry and Astronomy, Geology and Physical Geography, Civil Government, Agriculture, Roads and Fences, Water Supplies.

This course of study, comprising ten semesters, shows three distinct parts, either of which may be studied by itself, provided the pupil has necessary qualifications to take its studies.

I. A Preparatory Course, included in the first and second semesters.

II. A Course in Horticulture, included in the third, fourth, fifth and sixth semesters. Those completing this course will be entitled to a certificate from the Faculty of the College.

III. A Course in Agriculture, which includes the course in horticulture, together with the seventh, eighth, ninth and tenth semesters. Those completing this course will be entitled to the degree of B. Ag.

By a special regulation, any student of the University can enter any of the classes of the Agricultural College for the study of any particular subject, as entomology or landscape gardening, and be excused when that subject is finished. He may receive a testimonial of his standing in such special study from the Dean of the College.

PROFESSIONAL STUDIES OF THE AGRICULTURAL COLLEGE.

YEAR.	STUDIES.	HOUR.	TEACHER.
HORTICULTURE. FIRST YEAR. First Semester.	Propagation, Pruning and Training, Soils and Tillage and Tools	V.	Swallow.
	Fruits and Nursery Business*	V.	Husmann.
Second Semester.	Gardens and Gardening	V.	Tracy.
	Ornamental Trees and Shrubs	V.	Husmann.
	Landscape Gardening, (12 Lectures)	V.	Swallow.
SECOND YEAR. First Semester.	Meteorology, (10 Lectures)	IV.	Swallow.
	Pomology and Forestry	IV.	Husmann.
Second Semester.	Entomology and Economic Botany	IV.	Tracy,
AGRICULTURE. THIRD YEAR First Semester.	Farm Drainage, (10 Lectures)	.....	Swallow.
	Farm Crops	.....	Tracy.
Second Semester.	Domestic Animals	.....	Swallow.
FOURTH YEAR. First Semester.	Agricultural Chemistry	.....	Schweitzer.
	Veterinary Science	.....	
Second Semester.	Farm Buildings, Fences, Roads, Water Supplies and Farm Machinery	.....	Swallow.

*In this the pupil is fitted to engage in the profitable business of selling nursery stock by which he may, during vacation, pay his collegiate expenses if he be energetic and skillful. Any number can do this.

PRIZES.

There are two permanent prizes connected with the Agricultural College:

The Harris Medal, to the Senior Class, "For the best Essay on Dairy Stock," or "Indian Corn."

The Swallow Prize, Lowdon's Encyclopœdia of Agriculture, to the Freshman Class, "For the best Examination or Essay on Pruning."

DEGREES GIVEN IN THE AGRICULTURAL COLLEGE.

Students who have finished the four years' course, shall be entitled to the degree and diploma of Bachelor of Agriculture (B. Ag.).

Those who complete the course in Horticulture shall be entitled to a Certificate.

DESIGN OF THIS INDUSTRIAL COLLEGE.

It is the design of this school to give an education that will fit the pupil for intellectual and manual labor—to make him a man in body and mind, that he may enjoy the *mens sana in corpore sano.* Our graduates must be the peers of scholars in mental culture, and the equals of laborers in manual skill and physical development, that they may be prepared to honor labor and to utilize and dignify learning.

To do this, one must have a thorough knowledge of his profession, and be able to do his work with skill and care.

The first and highest employment of man is to cultivate the soil, to feed and clothe the world. To do this well has been the ambition of the great and good of every land. The increase of populations and the multiplied demands for the products of the soil, must render this department of human industry more and more prominent, lucrative and honorable.

It is, therefore, eminently appropriate for this College, located in the midst of the best agricultural regions of the continent, in which the populations of the earth are concentrating with unprecedented rapidity, to invite our youth to such a collegiate course of study and labor as will best fit them to develop the agricultural and mechanical resources of the State, and meet the coming demand upon their capacities. For such an education, a man must learn two thing:

1. What to do, and how it should be done.
2. He must acquire the manual skill to do it, and do it well.

To know what and how, is the Science.

To have the manual skill, is the Art.

To get the Science, he must study.

To get the Art, he must work.

Our Industrial College, then, must be a school of labor as well as of study. But how much study and how much labor, are questions not definitely settled, but in general terms it may be stated:

The pupil must study until he knows what should be done, why and how. When this is accomplished, the intellectual division of an industrial education is finished.

The pupil must labor until he can do all farm work with skill; and when this is accomplished, the manual division of an agricultural education is finished.

Whatever is more than this, has no more place in an agricultural school than in any other. It is not the idea of our school to furnish a place for pupils to work,* but a place where they may learn to work as well as to think.

But what shall the pupil do? Everything that is done on the farm, in the garden, orchard and nursery.

Who shall direct the labors of the pupils? He who teaches what is to be done, why it should be done, and how, is the one to see that it is done, and well done. Then the teaching and practice will agree, science and art go hand in hand. This will prevent the introduction of many useless and impracticable theories. When one teaches merely, he can advance many beautiful theories for others to practice, but when he is expected to carry out his own suggestions, he will be more cautious, take more care that his instructions will bear the test of actual experiment.

HORTICULTURAL DEPARTMENT.

As the ladies of Missouri have done so much to create a taste for the culture of fruits and flowers and ornamental grounds, it is but just that the Commonwealth should provide a school where their daughters, as well as sons, may perfect themselves in these delightful pursuits. All necessary fixtures will be provided to make this Department of the Industrial College most useful and instructive.

The ladies are, therefore, invited to partake of the benefits of this Horticultural course, where everything will be so managed as to awaken and cultivate the most refined and exalted tastes, and lead woman back to the pursuits she so much enjoyed in Eden.

* We furnish work, as far as possible, for those who desire it as a means of support; but this is no part of the plan of instruction.

The first class in this Department was formed during the year 1874. It consisted of nineteen young ladies and five young gentlemen, besides a large number of agricultural students. Twenty-four completed the course and received diplomas.

AGRICULTURAL LECTURES.

Lectures are given each day on the practical applications of science to agricultural pursuits.

The students of this college are, by law, admitted to the lectures and other exercises of all the Departments of the University.

CLASSES TAUGHT BY THE PROFESSORS OF AGRICULTURE IN 1879-80.

FIRST SEMESTER.

Mineralogy and Paleontology, (Prof. Swallow)	23
Zoölogy, (Prof. Swallow)	68
Freshman Agriculture, (Prof. Swallow)	38
Geography, (Prof. Tracy)	98
Fruits and Nursery Business, (Prof. Husmann)	38
Sophomore Agriculture, (Prof. Swallow)	2

SECOND SEMESTER.

Botany, (Prof. Swallow)	91
Geology, (Prof. Swallow)	23
Freshman Agriculture, (Prof. Swallow)	42
Entomology, (Prof. Tracy)	48
Economic Botany, (Prof. Tracy)	51
Pomology and Forestry, (Prof. Husmann)	

STUDENTS IN PRACTICAL AGRICULTURE.

Freshman Class	42
Sophomore Class	3
Junior Class	3

WORK ON THE FARM.

The Farm House, heretofore used as a boarding-house, has received extensive repairs, and the outbuildings have been greatly improved. The Farm House is now occupied by Prof. Swallow, who, by the action of the Curators, is placed in immediate charge of all farming, horticultural and garden operations.

Much new fence has been built, and a large amount of the old repaired.

Some new hedges have been put out, and all the old ones put in prime order. All the Osage Orange hedges promise well. The Honey

Locust hedge will evidently sooner make a fence which will be a more perfect protection against man and beast. But the Arbor Vitæ hedge gives some promise of success, even in our hot, dry summers and clayey soils. It will do better in wet, sandy soils.

A Garden, designed to be a Model Farm Garden, has been cleared up, fenced and planted with small fruits—grapes, strawberries, gooseberries, currants, blackberries and raspberries—and all the most useful vegetables in sufficient quantities to supply a large family throughout the year.

EXPERIMENTS IN INDIAN CORN.

A series of experiments has been undertaken on the Agricultural College Farm with Indian corn, to determine with absolute certainty what varieties of corn are most profitable for the various uses for which they are cultivated in Missouri. Thirteen varieties were planted in 1877, fifteen in 1878 and twenty-seven in 1879.

The comparative results of the experiment in 1877 were published in the catalogue of 1878; of the fifteen varieties tested in 1879, in the catalogue of this year, and the results of the twenty-seven varieties in 1879 in Mr. Maddex's report.

We have also made experiments in the culture of wheat, potatoes and oats. (For the results, see Prof. Tracy's report.)

We shall also make the most exhaustive experiments with the various fruits, to determine those best adapted to our climate and soils. (See Prof. Husmann's report.)

THE BEST FRUITS AND SEEDS,

Thus determined, will be distributed to the people of the State.

The refusal of the last Legislature to give any assistance in supplying the farm, the garden and the nursery with the necessary and ordinary buildings and implements needed in progressive work, has compelled the College to suspend its experimental and practical work, or adopt a new policy for obtaining the funds necessary for its support.

While the other States have given their agricultural colleges endowments amounting to several hundred thousand dollars, and large annual appropriations, our own State has given ours virtually no endowment and no annual appropriations; and yet our people require the same results, the same instruction and the same costly experiments as are demanded of colleges well endowed, and to which large annual appropriations are made.

To meet these demands the College is compelled to undertake a money-making work. Heretofore its nursery products have been

sold to dealers at mere nominal figures; but hereafter it will undertake to supply all demands for horticultural products, and, as far as possible, seeds of the best varieties of our farm crops. The very best fruits and ornamental plants will be offered the people of the State through the most reliable agents.

DONATIONS.

The College is indebted to Miss Narcissa Bradford for a very valuable collection of minerals, trees and cereals of California.

To the Gale Manufacturing Company of Adrain, Michigan, for their excellent Gale Chilled (two-horse, walking) Plow.

To Mr. I. A. Hedges for several samples of first rate "Sorgo Sugar," and for sorghum seeds.

To Mr. J. T. Moulton, Jr., of Knob Lick, for fine polished specimens of Missouri granite.

To Mr. ———, for a triplet of very fine Cochin-China chickens.

To the San Francisco Produce Exchange for a gallon of the Cuzco corn, by Hon. W. H. Walker, Secretary.

To Mr. A. Harrison of Utah, for rare specimens of silver ores from Utah.

To Henry Shaw, Esq., of Tower Grove Park, for many valuable seeds and plants.

To Mr. John P. Royal for valuable specimens of California minerals and woods.

To Mr. W. S. Williamson for specimens of wheat.

To Mr. W. T. Russell for specimens of corn.

To U. G. Phetzing for some fine leaf tobacco.

To A. G. Rogers, Esq., of Lathrop, Mo., for the best of all the patent mole traps.

ARTICHOKES.

Our experiments with artichokes for hogs, has, so far, proved most favorable, and we shall extend the culture of this food, in full belief that artichokes are the cheapest food for swine that we can raise; and their free use will utterly eradicate the so-called hog cholera.

I herewith enclose the reports of Profs. S. M. Tracy and George Husmann, and Superintendent Maddex.

All Departments of this College are in much better condition to do good work than ever before. The hot-house places the Horticultural Department on a working basis. Prof. Husmann is rapidly occupying the best parts of the farm with fruit trees and nursery stock; and Mr.

laddex can scarcely find room for the stock, his experiments, and the rowth of seeds to supply the demand made upon us.

But we need a stable for housing our crops and feeding our stock, ıd we need our natural history room to display our collections.

We ought to enter upon the manufacture of Sorghum Sugar, that ır pupils may become experts, and go out to build up this interest to ve at home the millions we annually send abroad for sugar. It is early demonstrated that we can make as good sugar as we buy from her countries, and do it for less money.

In conclusion, I cannot refrain from expressing my gratification at e skill, energy and devotion displayed by Professors Tracy and Husann, and Superintendent Maddex, in the discharge of the various ıties assigned them.

All of which is respectfully submitted,

G. C. SWALLOW, Dean.

REPORT OF HORTICULTURAL AND GARDEN DEPARTMENTS.

G. C. SWALLOW, *Dean Agricultural College:*

The following report of the work done in this Department dur the session of 1879, is respectfully submitted:

FIELD WORK.

WHEAT.

In the report for 1868–79, the results from testing forty-eight vari ties of wheat were given. In September, 1878, all of the varieties test during the previous year, excepting Chidham, were sown together wi six additional varieties. The wheat was sown on the same land whe it was cultivated last year—a clayey loam, sloping to the south. Th field was sub-soiled and planted with corn in 1876; in 1877 a crop oats was raised, followed by wheat in 1878.

In August, 1878, a portion of the land was manured with slaughte house refuse, which was composted with earth in 1876, and was appli at the rate of five two-horse wagon loads to the acre; the remainder the land was manured with stable manure at the rate of twenty loa to the acre. The wheat was sown so that each variety was grown o land having each kind of manure. The slaughter-house refuse ga the largest straw, but the brightest and the plumpest grain came fro the land having the stable manure.

About September 1, 1878, the land was plowed six inches dee On September 25, it was thoroughly pulverized three inches deep wit a revolving harrow, and, on September 28, the seed was sown with drill, at the rate of 1⅓ bushels per acre. No after cultivation was give to the crop.

The season was an unusually favorable one. Rain, soon after sow ing, gave the seed a good start, and heavy snows, from December t February, prevented the young plants from being thrown out of th ground by the freezing and thawing of winter. The spring of 1879 wa

ry dry, causing a short growth of straw, and rains, about the time of ading out, enabled the heads to develop well, thus making a very ich heavier yield of grain to the weight of straw than was reported 1878. On April 4, a severe frost occurred, the mercury indicating degrees, and a few of the more tender varieties were somewhat in-ed.

The following table shows some of the results of the tests made s year as compared with those of 1878. In the table no mention is de of such varieties as have given less than fifteen bushels to the e as the average of two tests.

RESULT OF TESTS MADE IN 1879 AS COMPARED WITH THOSE OF 1878.

VARIETY.	Date when harvested		Height—feet		Weight per bushel		Bushels of grain per acre		Weight of straw per acre		Weight of straw per bushel of grain		Smooth or beard	Color of grain		Size of grain	
	1878	1879	1878	1879	1878	1879	1878	1879	1878	1879	1878	1879		78	79	78	79
Amber	June 21	June 18	3½	3¾	55	62½	20.16	31.03	2576	3240	122.8	104.4	S	A	R	s	m
Arnold's Hybrid	" 19	" 16	4	4	59	61	33.23	36 56	4592	3820	140 7	104.4	S	W	A	l	l
Clawson	" 21	" 19	4½	4½	58	60	28.07	39.42	2646	3882	96.4	97.2	S	W	W	l	l
Deihl	" 21	" 22	3	3½	55½	61	14.42	39.60	2096	3897	145.3	98.4	S	W	R	s	m
Dott	" 19	" 16	3½	4	59	62	31.04	36.40	3904	3778	125.8	103.8	B		R	l	l
Egyptian	.....	" 20	.....	3½	.....	60	.....	32.19	.....	3032	.....	94.2	B	.....	R	...	m
Fultz	" 17	" 12	4	3¾	59	63½	15.28	35.90	1728	2776	113.5	87.0	S	R	R	m	m
Gold Medal	" 24	" 19	4	3½	57½	60½	17.39	34.68	1886	3413	108.5	98.4	S	W	W	l	m
Jenning's White	" 19	" 16	3	3½	59	60½	24.96	35.90	2848	3576	114.1	99.6	B	W	W	m	l
Kentucky	" 11	" 18	4	3¾	58½	61	25.76	29.04	3920	2840	152.2	97.8	.....	W	A	l	m
Louisiana	" 21	" 18	3	3½	55	58	19.49	31.18	2952	2881	151 5	92.4	.....	W	W	s	m

Mediterranean, smooth	.....	"	12	.....	4	.....	63	.....	29.42	.....	4318	.....	146.6	S	.....	R	...	m
Michigan Wick	" 21	"	18	3	3¼	57½	61	28.32	24.71	3245	3665	114.6	105.6	B	W	W	l	l
Mold's Red	.....	"	24	.....	3	.....	56	.....	12.58	.....	1080	.....	85.8	S	.....	R	...	s
Mold's White	.....	"	24	.....	3	.....	59	.....	28.85	.....	2562	.....	107.0	S	.....	A	...	s
Muskingum	" 19	"	18	3½	3¼	58½	64	21.92	32.73	3088	3496	140.9	106.8	S	A	R	m	m
Nursery	" 25	"	20	3½	3	52½	60½	18.80	38.62	2248	3765	162.0	97.5	S	W	A	s	s
Oregon Club	" 21	"	18	4	3	56	58½	28.80	31.88	3600	2768	125.0	88.2	S	W	W	s	m
Polish	.....	"	24	.....	3¼	.....	58½	.....	35.20	.....	3826	.....	94.5	S	.....	A	...	s
Post	" 25	"	18	3½	2¾	52	59	19.49	34.04	2952	1236	151.5	36.8	B	W	A	l	l
Red Lancaster	" 18	"	18	4	3¾	60	60½	24.65	29.78	3552	3484	144.0	117.0	B	R	R	l	l
Red May	" 8	"	9	3½	3¼	59	62	27.52	32 46	3024	3350	110.5	108.2	S	R	R	s	s,
Red Russian	" 19	"	18	3	3¼	60½	58½	24 00	25.70	4016	3454	167.3	134.4	B	R	R	l	l
Sanford	" 26	"	19	4	3½	59½	61	18.82	33.81	1952	3631	103.7	107.4	B	W	W	l	m
Shumaker	" 17	"	16	4½	3¾	60	60	30.56	37.20	4628	3782	151.3	99.0	S	A	R	l	l
Silver Chaff	" 25	"	19	4½	4	59½	60½	17.82	38.47	1858	3439	104 3	89.4	S	W	W	l	l
Tappahannock	" 10	"	16	3½	3½	59½	62	20.32	30.67	2064	2576	100.2	84.0	S	W	W	m	m
Touzelle	" 25	"	24	4½	3	56½	56	15.68	17.90	1952	1826	124.5	102.0	S	.....	A	l	l
Treadwell	" 21	"	20	3½	3½	57½	61	19.52	52.38	3227	4620	165.3	88.2	S	W	W	l	l
White Rogers	" 19	"	18	4	3½	53	60	38.72	38.78	4304	3420	111.2	77.2	B	W	W	l	m
Zimmerman	" 15	"	19	3½	4	60½	62	16.32	32.05	2224	3692	136.3	115.2	S	R	R	s	m

RESULT OF TESTS MADE IN 1879 AS COMPARED THOSE OF 1878—Continued.

VARIETY.	Date when harvested		Height—feet		Weight per bus.		Bushels of grain per acre		Weight of straw per acre		Weight of straw per bushel of grain		Smooth or beard	Color of grain		Size of grain	
	1878	1879	1878	1879	1878	1879	1878	1879	1878	1879	1878	1879		78	79	78	79
Russian, No. 1	June 29	" 21	3½	3½	55½	61½	14.21	29.15	2608	2475	183.5	119.2	S	A	W	m	m
" No. 2	" 9	" 18	3½	3½	60	61½	28.36	27.36	2558	2462	100.5	90.0	S	W	W	l	m
" No. 3	" 29	" 24	3	3¼	50½	57½	8.30	35.66	1872	2559	212.7	98 4	S	R	R	l	m
" No. 4	" 25	" 20	4½	3¾	57	60	26 40	25.50	2992	2922	113.3	114.6	S	R	R	l	s
" No. 5	" 29	" 24	3½	3	48	57½	21.12	29.81	4320	4900	204.6	164.4	S	R	R	s	s
" No. 6	July 3	" 28	4½	3¾	58	59	31.52	32 22	3952	3673	125.4	114.0	S	W	W	l	m
" No. 9	June 29	" 21	4½	3½	57½	60	24 48	32.44	4912	2219	200.6	68.4	B	R	R	l	m
" No 10	" 29	" 21	4½	3½	57½	60	17.44	32.07	4000	3464	229.4	108.0	B	R	R	m	m
" No. 11	July 3	" 24	3½	3¼	54½	57½	7.38	29.91	2048	3230	277.5	108.0	S	R	R	s	s
" No. 12	" 3	" 24	3½	3½	52	56	9 41	37.48	1728	3261	183.6	87.0	S	R	R	s	s
" No. 13	" 3	" 21	3½	3	56½	55½	16.80	32.56	2944	3664	174 0	111.0	S	A	A	m	s
Average					57⅛	60	21 93	32 59	3107	3270	145.6	101.2					

In making up the average for 1878, Fultz, Gold Medal and Silver Chaff are omitted, the yield that year having been lessened by accidental causes.

EXPLANATION.—A., Amber; R., Red; W., White; B., Bearded; S., Smooth; s., small; m., medium; l., large.

Many of the varieties mentioned in the table are known by other names in different parts of the State, and below are given a few synonyms: Red Lancaster, known as Red Sea; Early Michigan, known as English Bull and Missouri Swamp; Red May, known as Early May, Gold Drop, Tennessee May, Orange Red May, Yellow Lammas; Zimmerman, known as Democrat, Alabama May, Walker, Wilson, Late May, Lime, Golden Chaff; Clawson, known as Genesee, Seneca; Mediterranean, smooth, known as Sea Island.

From the table it will be seen that, in 1878, the time of ripening extended from June 8th to July 3d, while in 1879 it was several days shorter, from June 9th to 24th, maturity having been hastened by the drouth during the growing season.

The average yield of the varieties ripening each day was as follows:

Date.		1878.	1879.
June 8	Bushels per acre	27.52	.....
9	" "	23.36	32.46
10	" "	20.32	.....
11	" "	25.76	.....
12	" "	.....	34 97
15	" "	16.32	.....
16	" "	.....	36.36
17	" "	22.57	.....
18	" "	24.65	31.54
19	" "	28.98	35.69
20	" "	.....	37.17
21	" "	22.68	31.56
23	" "	.....	32.22
24	" "	18 06	27.80
25	" "	18.54	.....
29	" "	17.11	.....
July 3	" "	16.28	.....

By this it will be seen that, from the beginning of harvest to June 21st, in 1878, and to June 20th, in 1879, there is but little difference in the yield, but that after those dates, especially in 1878, the yield decreases. The actual decrease was greater than is indicated by the table, as eighteen varieties, which yielded less than fifteen bushels to the acre, and are not included in the table, all ripened June 29th or later, in 1878, and June 21st, or later, in 1879. With a selection from the varieties ripening before June 21st, the time of harvest extends over thirteen days, which, in most cases, is sufficient time to enable the cultivator to harvest his crop when it is in just the right stage; and, by a proper selection of seed during a series of years, it will doubtless be possible to extend somewhat the time of harvest.

The weight per bushel of the different varieties varies almost exactly, as does the yield, the lightest varieties being those which ripened latest.

The weight of straw, required for a bushel of grain, is matter which should receive more attention than is usually given to it. Although the straw, which is required to produce a bushel of grain, is not as exhaustive to the soil as is the grain itself, still every pound of straw takes from the soil a certain amount of the materials which are necessary for the production of either grain or straw. If all the straw were returned to the soil for manure, the amount produced would be of comparatively little importance; but this is seldom done, and when, as is too often the case, the straw is burned or is allowed to decay without being distributed over the farm, it is a constant drain, the effects of which will eventually be seen in the constantly decreasing yield of grain or in the increased amount of other fertilizers required to maintain the fertility of the soil. It will be noticed, in the foregoing table, that those varieties giving more than the average yield to the acre have less than the average amount of straw to the bushel.

Although every variety, with one exception, gave a larger yield in 1879 than in 1878, the most marked increase is shown in the Russian kinds, which gave an average yield of 31.29 bushels per acre in 1879 against 18.22 in 1878. They all seem very hardy, and stand up well; but the proportion of straw is greater than in the American varieties. The Oregon varieties have all been discarded, excepting the Oregon Club, which yielded less than the average this year, but more than the average for two years.

In addition to the varieties mentioned in the table, the following were tested in 1878 and 1879, on the same land, and under the same circumstances as the others, but having yielded only from three to fifteen bushels to the acre, they have been dropped, viz: Grecian White, Hert's White, Lammas, Oregon, Oregon Champion, Trump, Victoria, Russian Nos. 6 and 7.

The following varieties, viz: Early Michigan, Rice, Smith, Amber Straw, Bull and Taos, were also sown, but, as the seed was not received until late, and was sown on a different soil from the trial crop, no comparison can be made before another year.

Several of the varieties which succeeded best in 1878, and a few of the varieties received last fall, were sown on the College farm. With these crops, Mr. Maddex, Farm Superintendent, reports the following results: "Clawson, two fields yield 23 and 26½ bushels per acre; Silver Chaff, 20 bushels; Fultz, two fields, 16 and 25 bushels. These crops were all raised on dry white oak ridges which have been in cultivation for many years, and have received almost no manure. On one field, where Zimmermann was almost a failure in 1878, Sanford and Smooth Mediterranean were grown, and yielded 15 bushels per acre. Mold's White and Mold's Red

gave only 11 bushels, and Polish 15 bushels to the acre." With the means at our disposal, we have been unable to make any tests to show the relative values of the different varieties for the manufacture of flour.

OATS.

On March 22, 1879, ten varieties of oats were sown. The land on which they were cultivated had been in corn for many years and had never been manured; but, by subsoiling, on each alternate year since the land came into possession of the College, it had borne good and constantly increasing crops.

The land was a clay loam, slightly sloping to the west, and was plowed and subsoiled about March 10th. On March 22d the oats were sown with a drill at the rate of two bushels to the acre.

The following table shows some of the results of the trial:

Name.	Date when cut....	Height—feet.....	Wt. per bushel...	Yield per acre...	Straw per acre....	Color of grain....	Color of grain....
Black Egyptian	July 8...	2½	38	38	1520	40	B
Black Tartarian	July 15...	3½	35	54	2322	43	B
Board of Trade	July 3...	3	30	27	1755	65	W
Finefellow	July 10...	3½	36	59	3186	54	W
Hulless	June30...	2½	48	29	1479	51	
Probstier	July 10...	3	30	52	2288	44	W
Schonen	July 10...	3½	35	50	1950	39	W
Surprise	July 10...	3¼	36	30	2070	69	W
Rust Proof	July 3...	2½	32	29	1450	50	R
Webbs Challenge	July 3...	3	32	27	1755	65	W
Average	.....	.....	35.2	40.3	2016	51.6	

Explanation: B., Black; W., White; R., Red.

In addition to those varieties mentioned in the table, twelve others, viz: Birlie, Canadian, Houghton, Oregon, Oregon Surprise, Potato, Ramsdell's Norway, Russian, Somerset, Swedish, White Swedish and Yetter, were sown; but in such small quantities as to be of no value as a test, but sufficient to furnish seed for a thorough trial next year.

The trials of both wheat and oats will be continued another year, and the next report will give the results of all the tests. The results of these trials should not be taken as being anything more than an indication of which may be the best varieties, as the success of any farm crop depends upon so many attendant circumstances, the amount of rain at different times, the severity of the weather, and many other

matters, which it is impossible to provide for, that several trials must be had before reliable calculation can be made.

POTATOES.

The trial of potatoes, commenced in 1878, was continued in 1879, but, owing to a very unfavorable season, the results were unsatisfactory. In the main, the yields from the two hundred varieties tested, agreed very nearly with those of 1878; but many of the late varieties suffered from the extreme drouth. Beauty of Hebron, Early Vermont, Ruby and Pride of America (B—4 of last report) were among the best. Several of the seedling varieties, originated here, promise well, but need to be more fully tested.

MISCELLANEOUS.

One-fourth of an acre was sowed with Pearl Millet, which reached a height of from five to six feet, and gave only about one-third the amount of feed which could have been cut from the same amount of land sowed with corn.

A few artichokes were planted on a piece of low ground which was naturally rich and which had been very highly manured, so as to give an extraordinary yield. The crop harvested from this piece of ground was at the rate of 1750 bushels per acre.

Chufas, or Earth Almonds, were planted on a strip of ground adjoining the artichokes, but gave a very small yield—not enough to pay for digging.

IMPROVEMENTS.

In October, 1879, a green-house was commenced, which was completed in December. The house is 25x100 feet, with span-roof, furnace and potting-room, cellar, etc. It is heated by a Banch hot water apparatus, which, so far, has proved very satisfactory. The collection of plants, now in the house, is quite large, and contains many rare plants, which are an invaluable means of illustration for the classes in economic botany and agriculture. The sale of plants and flowers from the green-house has more than paid the current expenses of the house, and will doubtless become a source of profit. The building of the house necessitated some changes in the arrangement of the grounds, which are being made as rapidly as possible.

In order to place the results of our experimental work before the people of the State, exhibits of the various crops raised were made at the Boone county, Kansas City, Moberly and St. Louis fairs.

DONATIONS TO HORTICULTURAL DEPARTMENT.

J. R. Wagaman, Carrollton, Mo., two varieties wheat; E. Link, Greenville, Tenn., four varieties wheat; Ohio Agricultural College, two varieties wheat; B. J. Bidwell, Tecumseh, Mich., two varieties wheat; United States Department of Agriculture, through Hon. Wm. G. LeDuc, U. S. Commissioner of Agriculture, a very fine collection of some hundreds of rare and valuable plants of economic interest, and Supt. Saunders executed this order of the head of the department in a manner entitling him to our acknowledgment—our green-house has enabled us to receive and preserve this. Col. F. T. Russell, Columbia, Mo., potatoes; E. H. Smith, Dubuque, Iowa, potatoes and wheat; S. Tracy, Platteville, Wis., corn; A. J. King, New York City, assortment of apiarists supplies; G. W. Hogan, Brunswick, Mo., corn; M. Smith, Kirkwood, Mo., corn; C. Vernon, Millersburg, Ill., corn; J. M. Thorburn & Co., New York, potatoes; E. N. Tracy, Platteville, Wis., plants; C. E. Prunty, St. Louis, Mo., three varieties wheat; a friend, who forbids our mentioning his name, has placed us under special obligations for plants and seeds from his valuable private collection.

Very respectfully,

S. M. TRACY,

Prof. of Entomology and Economic Botany, and Supt. of Gardens

REPORT OF DEPARTMENT OF POMOLOGY AND FORESTRY.

SUMMARY OF WORK FROM JUNE 1, 1879, TO APRIL 23, 1880.

Prof. G. C. SWALLOW, *Dean of Agricultural College:*

DEAR SIR:—I have the honor herewith to submit a short synopsis of work in my department, during the last eleven months.

Nursery.—The operations in this branch were extended as rapidly as our limited means would allow, and the growing demand justified. The announcement issued to the people of the State, that a commercial nursery had been commenced here, seems to have met with universal favor, as about one hundred and twenty orders, filled direct from the nursery, and received by me, and about two thousand sent in, and filled for agents, would seem to testify. We have handled and sold during the last fall and spring, about fifteen thousand apples, six thousand peaches, fifteen hundred pears, cherries, plums, apricots and quinces, twenty thousand grape vines, and a corresponding quantity of small fruits, ornamental and other trees and shrubs—a very encouraging beginning for so young an enterprise, which has induced me to propagate and plant extensively. About fifty thousand grafts of apples, peaches, plums and apricots were grafted this winter, and have been put out this spring, besides about ten thousand young shade and ornamental trees, ten thousand young evergreens, twenty thousand grape cuttings, and a multitude of other stock—peaches, pears, cherries, etc. The extreme drouth continuing all the year round, has had a very deleterious effect on our young plantations, and would plainly indicate that sufficient means of irrigations are imperatively necessary to prevent heavy loss in the future. This would make us independent of the weather, and make the business already established, a source of steadily increasing income, as well as of great benefit to the people of the State, who are thus supplied with reliable stock at moderate prices.

Vineyard.—The vineyard was properly cultivated, summer-pruned and tied, and yielded about three hundred and twenty-five dollars worth of grapes. It has made a fine growth, and promises an abundant yield this season. Many new valuable varieties have been added, and I ex-

pect to be able to show fruit of some sixty varieties the coming fall. The old trellis was repaired and new trellis made.

Orchard.—Over one thousand trees of apples, pears, peaches, plums, cherries, apricots, etc., will be added to the orchard this season, comprising nearly all well known varities, and many new and rare ones to test their value in this State.

Fruit Garden.—About an acre will be added to the small fruits this spring, and we expect to be able to supply the town of Columbia, as well as some other markets, with their products. New varieties are also constantly added to the extensive collection we already have, and the result of these experiments given to the public.

Hedges.—The hedges were repeatedly pruned last summer, and give great promise of success. Two of them are of sufficient age to turn stock, and prove a complete fence against the most unrully cattle. I am experimenting with several other hedge plants, besides the Osage Orange and Honey Locust. We are testing the Buckthorn, and several others.

Forestry.—We shall plant quite a number of Catalpa and other timber trees this spring, and initiate a regular system of forest culture for timber.

About ten acres of new land, south of the farm house, were cleared to be used for orchard and nursery, of which about four acres will be planted this spring.

In the class of Pomology, instructed by me during the winter, there were thirty-eight students who received instructions in the theory of fruit-growing in the lecture room, as well as practical instruction in grafting and budding, and other operations connected with fruit culture. Many of them intend to canvass during vacation, as agents for the sale of nursery stock, and I trust that the people will find them more intelligent, honest and trustworthy, than the majority of itinerant tree peddlers, now infesting the State.

Among the donations of seeds and plants received by me during the year, I will name those from the Department of Agriculture, Washington, D. C., seeds and plants; Jacob Rommel, Morrison, Mo., grafts of new and valuable grapes, apples and peaches; Samuel Miller, Bluffton, Mo., strawberry plants; J. W. Fleeman and Jacob Madinger, St. Joseph, cuttings and scions; R. F. Lynes, West Plains, Mo., buds of new peaches; Capt. Saunders, Boone Co., Mo., cuttings of grapes; G. C. Eggling, Superintendent of Parks, St. Louis, collection of seeds; Geo. W. Campbell, Delaware, Ohio, grape vines; T. S. Hubbard, Fredonia, N. Y., scions of Prentiss grape; John Charleton, Rochester, N. Y., scions of grapes; James H. Ricketts, Newburgh, N. Y., scions

of grapes; J. W. Prentiss, Puttney, N. Y., scions of grapes, and many others.

Upon the whole, the department has made very satisfactory progress, and although I feel, every day, the many wants arising from the scarcity of means allotted by our Legislature, and cannot develop the many facilities, which are apparent to me, as fast as I could wish, for the want of these means, yet, we do the best we can, have made a satisfactory beginning, and I hope that the people and the next Legislature will more fully appreciate our labors, and be more liberal toward an institution working for the interest of the whole commonwealth.

Respectfully,

GEORGE HUSMANN,

Superintendent Department Pomology and Forestry.

FARM DEPARTMENT—REPORT 1879-'80.

PROF. G. C. SWALLOW, *Dean Agricultural College:*

The Farm has now good specimens of full-blooded Short-horns, 6; Alderny, 1; Cotswold sheep, 2; Lincolns, 4; Leicesters, 4; graded Southdowns, 45; Poland-chinas and Berkshires.

We have made improvements in quantity and quality of hogs, sheep and cattle.

Ten acres of brush land has been cleared for tobacco; new fences made, old ones repaired, and straw sheds for stock and implements have been built.

We have growing, 55 acres wheat, 12 acres oats, 50 acres meadow, 10 acres corn, 5 acres artichokes and about 200 acres of pasture.

CROPS OF LAST YEAR.

Wheat, 710 bushels, the most of which was distributed for seed.

Corn, 2,250 bushels, of which 300 bushels were distributed as seed.

Artichokes, quantity unknown, as the most of them were dug by the **hogs**; but 300 bushels were distributed for seed.

Oats, 400 bushels.

Hay, 20 tons.

Beef cattle sold, 25 head.

Hogs sold, 35 head.

One hundred bushels of the Evans corn, and 270 bushels of artichokes, were sold to the Commissioner of Agriculture at Washington.

The Evans corn still proves the best stock corn we have tested.

On the next page will be found a table showing, in condensed form, the results of the comparative tests of corn for the year 1879.

Respectfully submitted,

ROBERT MADDEX.

Farm Superintendent.

THE FOLLOWING TABLE SHOWS, IN A CONDENSED FORM, THE RESULT OF THE COMPARATIVE TESTS OF CORN FOR THE LAST YEAR, 1879:

NAME.	Date of ripening	No. of ears on 100 stalks	Weight	Color of corn	Length of ear	Circumference of ear	How filled out	No. of rows	No. of kernels in row	Weight of corn	Weight of cob, ozs.	Circumference of cob
Baden	Sept. 5	140	489	W	8.5	6 1	Well	16	50	9.010	1.115	3.4
Bloody Butcher	Sept. 5	110	459	Ry	10.8	6 5	Fair	14	57	11.280	2.810	4 7
Chester County Mammoth	Sept. 15	112	484	Y	9.8	6.7	Well	20	56	10.015	1.780	4.3
Early Yellow	Aug 20	106	374	Y	10.1	5 8	Well	14	61	9.105	1.320	3 2
Evans	Sept. 5	108	564	Y	9 5	8 4	Well	18	62	14.820	1.910	4
Gold Dust	Sept. 15	104	512	Y	10.	6.7	Well	18	59	10 250	2.100	4 6
Golden Dent	Sept. 5	118	369	Y	8.	5.6	Well	12	53	8.150	1.280	3.3
Golden Yellow	Sept. 5	111	220	Y	9 5	6.4	Fair	16	55	10.110	1.310	3 5
Illinois Yellow	Sept. 5	108	365	Y	9.1	6 4	Well	16	52	9.640	2.105	4.1
Jersey Red	Aug. 15	106	427	Ry	10.6	6.1	Well	14	50	9.450	2.780	4 1
Long John	Sept. 15	120	553	W	12.1	5 6	Well	14	62	12.610	2.180	3.7
Long Yellow	Aug. 20	152	266	Y	14.1	4.8	Fair	8	66	8.345	1.750	3.1
New Madrid	Sept. 15	110	406	Y	9.	7.6	Fair	24	46	10.570	2.075	4.6
Pale Yellow	Sept. 10	108	500	Y	9.9	6.8	Well	16	45	10.125	2 080	4.2
Peabody	Sept. 1	260	507	W	9 3	4 6	Fair	8	57	4.250	1.215	3.1
Pennsylvania Flint		140	271	Y	12.5	4.5	Fair	8	66	6.010	9.020	2.9
Proctor Bread	Sept. 10	104	531	W	8.1	7.7	Well	26	48	12.260	2.010	4.8
Ragans White	Sept. 15	108	406	W	10 2	6.5	Well	12	55	10.115	2.670	4.1
Ragans Yellow	Sept. 20	98	408	Y	9 4	6 8	Well	18	58	11.850	1.450	3.6
St. Charles White	Sept. 12	116	491	W	9 2	6.7	Well	16	59	10.615	1 625	3.8
Thompson	Sept. 10	122	479	W	9.3	6.9	Well	18	46	11.815	2.220	4.
White Flint	Sept. 1	120	472	W	11.2	5.5	Well	14	64	9.170	1.890	3.7

MISSOURI AGRICULTURAL COLLEGE.

This College of the State University, established in 1870, has given scientific and practical instruction to more than 500 of the young men of Missouri, and is prepared to give such an education as will fit the recipient not only for the successful work of the farm, the garden and the orchard, but also for the duties of social and public life.

Our course of instruction consists of one year of preparatory English studies, two years of horticulture, gardening and fruit culture, and two years of farming, all accompanied by such literary and scientific studies as will place the student on an equality with the students in other Colleges of the University.

THE COLLEGE AS AN EXPERIMENTAL STATION.

Thus far, we have conducted various series of experiments:

1. To test the value of the Missouri subsoils by deep plowing, by subsoiling and by trench plowing.

2. To test the value of different plants and modes of growing hedges.

3. To test the comparative value of the different varieties of fruits in our soil and climate, and their capacity to withstand the attacks of the various pests and diseases incident to our State.

4. To test the comparative value of the many varieties of our farm crops.

These experiments will be continued under the new organization of the work of the College, and will be very much extended in the two departments of pomology and forestry and gardening as fast as time and means will permit.

OUR MEANS OF INSTRUCTION.

1. Our students may have the instruction of all the teachers of literature, science and language in the University.

2. They have technical and practical daily instructions in the lecture room and in the field by four men who have been life-long and successful workers in the scientific and practical labors of the farm and the garden, the nursery and the orchard.

3. We have lecture rooms, laboratory and apparatus for the technical and scientific instruction, and a farm, garden, nursery and orchard for our experiment and practical work.

RE-ORGANIZATION OF THE AGRICULTURAL COLLEGE.

By this re-organization the practical and scientific force of the College has been increased by the addition to the Faculty of Prof. Geo. Husmann, by a revision of the course of study, by arrangements to supply the State with reliable seeds of the best varieties of farm crops, the best fruits and the best ornamental trees, shrubs and other plants.

Mr. Robert B. Maddex is continued as Superintendent of the farm. Mr. S. M. Tracy is made Prof. of Entomology and Economic Botany and Superintendent of Gardens, Mr. Geo. Husmann is Professor and Superintendent of Pomology and Forestry, and G. C. Swallow remains Prof. of Agriculture and Dean of the College.

OUR PECULIAR RELATIONS TO THE STATE.

This is the only school devoted to the farming and horticultural interests of this great agricultural State.

While the agricultural colleges of other States have productive endowments amounting to several hundred thousand dollars, the lands and other endowments of this College yield a few hundred dollars only.

While other agricultural colleges have received from their State Legislatures annual appropriations varying from $5,000 to $50,000, our Legislature declines to give us even the labor of a few idle convicts to build our barns and fences, and clear up the farm given us by Boone county.

OUR FINANCIAL AND BUSINESS DEPARTMENT.

Thus left to our own resources for the means of educating the youth of the State for the highest and most useful of all employments, we are compelled to make the money needed by the products of the farm, the nursery and the garden.

To this end we now offer to the people of the State, through reliable agents, all the best varieties of fruits, trees, shrubs, ornamental and useful plants, and seeds of farm crops. We offer those only which have been tested and found suited to our soil and climate. We fully guarantee that all we sell shall be of the best quality, true to name, and be delivered in good condition and at reasonable prices.

Our agents will be capable, honest, and educated for the business. Nearly all of them are our own students.

TO THE NURSERYMEN AND GARDENERS

Of the State, we offer no opposition and bring no conflict of interest, but fraternal and co-operative relations; such only as shall be for our mutual interests. We will purchase of them their good, reliable surplus stock, and supply them with such as they may need on terms mutually satisfactory. We will test all new fruits sent us for the mutual advantage of all.

OUR STUDENTS

Are given the best possible course of instruction in Agriculture and Horticulture, both technical and practical; and, in addition, as good a course in literature and science as can be had in the country.

We also furnish the daily labor and the agencies for selling our nursery stock, by which all capable and economical young men can pay their way at the College.

In this effort to give our youth such an education as will best fit them for the duties of the farm and the State, we ask the co-operation and active sympathy of all our people; while we pledge the consecration of all our powers to the building up of this our favorite school.

Will the journalists of the State tell the people what we are trying to do for the good cause?

Shall Missouri have the only self-sustaining Agricultural College in the world?

G. C. SWALLOW,
Dean Agricultural College.

S. M. TRACY,
Prof. Entomology and Economic Botany and Superintendent of Gardens.

GEORGE HUSMANN,
Prof. and Superintendent Pomology and Forestry.

ROBERT B. MADDEX,
Farm Superintendent.

FIFTEENTH ANNUAL REPORT

OF THE

STATE BOARD OF AGRICULTURE

OF THE

STATE OF MISSOURI,

FOR THE YEARS 1880 AND 1881.

J. P. McAFEE, SECRETARY.

JEFFERSON CITY:
TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS.
1881.

MEMBERS OF THE STATE BOARD OF AGRICULTURE.

T. T. CRITTENDEN, GOVERNOR OF MISSOURI (*ex officio*)....Jefferson City, Cole county.
R. D. SHANNON, SUP'T PUBLIC SCHOOLS (*ex officio*).....Jefferson City, Cole county.
S. S. LAWS, PRES'T MISSOURI UNIVERSITY (*ex officio*)... .....Columbia, Boone county.
G. C. SWALLOW, DEAN AGRICULTURAL COLLEGE (*ex officio*)..Columbia, Boone county.
JOHN WALKER, PRESIDENT.....Jefferson City, Cole county.
N. J. COLEMAN.....St. Louis county.
E. C. MORE.....Columbia, Boone county.
GEORGE HUSMANN.....Columbia, Boone county.
M. K. LEAR.....Hannibal, Marion county.
H. ESHBAUGH.....Hanover, Jefferson county.
G. R. BUCKNER.....Naylor's Store, St. Charles county.
C. A. NEWCOMB.....Kimmswick, Jefferson county.
H. C. IRELAND.....Mooresville, Livingston county.
R. W. GENTRY.....Sedalia, Pettis county.

To the General Assembly of the State of Missouri :

I have the honor herewith to present the report of the Missouri State Board of Agriculture for the years 1880 and 1881, as required by the act establishing said Board, together with other papers of interest and value to agriculturists.

J. P. McAFEE,
Secretary of the Board.

BY-LAWS.

SECTION 1. The officers of the Missouri State Board of Agriculture shall consist of a President, Vice-President, Treasurer and Secretary.

SEC. 2. It shall be the duty of the President to preside at the meetings of the Board, to sign all warrants on the Treasurer ordered by the Board, and to perform such other duties as are or may be required by law. He shall be *ex officio* chairman of the executive committee. In his absence, the Vice-President shall perform his duties.

SEC. 3. It shall be the duty of the Secretary to keep and preserve the minutes and records of the Board, and the proceedings of the executive committee, to furnish a copy of the same for publication, previous to the expiration of his term of service, and to countersign all warrants on the Treasurer for money.

SEC. 4. The Treasurer shall keep the funds of the Board, and pay all warrants drawn by order of the Board, signed by the President and countersigned by the Secretary, and shall make his report at the annual meeting in November, of his receipts and expenditures, from whence received and to whom paid, properly arranged for publication. He shall give bond in such penal sum as may be required by the Board for the faithful performance of his duties, and the payment of all moneys in his hands.

SEC. 5. It shall be the duty of the Secretary to conduct all correspondence with societies and individuals; to issue such circulars for obtaining statistics or other information as the Board may direct, or as may be deemed expedient or useful; to collate and arrange the correspondence, proceedings of the Board, and the proceedings of the county societies for report and publication, as required by law, and distribute to county societies and others entitled to them, all seeds, plants, publications, etc., which may be acquired by the Board for distribution. His term of office shall hereafter commence the first day of March, and continue one year, and until his successor is elected.

SEC. 6. The President, Vice-President and Secretary shall constitute an executive committee, whose duty it shall be to inspect and audit all accounts, to inspect and pass upon all papers entering into the annual report, and to perform such other duties as may be required of them in the intervals between the meetings of the Board.

SEC. 7. The President shall have authority to call special meetings of the Board whenever he may deem it necessary or important to do so.

SEC. 8. These by-laws may be altered or amended at any annual meeting of the Board: *Provided*, That any member proposing to amend the by-laws at said meeting of the Board, shall give two weeks' notice prior to said meeting, to all the corporate members or their successors in office, of such intended motion to amend.

SEC. 9. The records of the proceedings of the Board shall at all times be open to the inspection of the members.

SEC. 10. Any corporate member, who shall be absent at two successive meetings (one of which shall be the annual meeting), shall forfeit his membership, and the Board may declare a vacancy in consequence thereof.

LAWS CONCERNING

THE

STATE BOARD OF AGRICULTURE

AND

COUNTY AGRICULTURAL AND MECHANICAL SOCIETIES.

STATE BOARD OF AGRICULTURE.

SECTION 4042. *Board of Agriculture created.*—A Board of Agriculture is hereby instituted and created a body corporate, by the name and style of the "Missouri State Board of Agriculture," and by that name shall have perpetual succession, power to sue and be sued, complain and defend in all courts, to make and use a common seal, and to alter the same at pleasure.

SEC. 4043. *Who shall constitute Board—shall meet and elect officers, when and where—salaries.*—The persons named as corporators of the Missouri State Board of Agriculture heretofore existing, are hereby constituted the members of the Missouri State Board of Agriculture, under this article, and there shall be a meeting of said Board of Agriculture as constituted by this article, held at the Agricultural College Building of the State University, on the second Wednesday of July, 1877, to elect a President, Secretary and Treasurer, and such other officers and agents as the Board shall deem necessary. And no officer, so appointed or elected by the said Board, shall receive any salary for his services, except the Treasurer and Secretary, and the salary of the Treasurer shall not exceed forty dollars per annum, nor shall the Secretary receive more than six hundred dollars per annum; and all the offices of the present Board of Agriculture are hereby declared to be vacant from and after the time when this act takes effect. (Laws 1877, p. 5, § 2.)

SEC. 4044. *Who are ex officio members of the State Board.*—The Governor, the State Superintendent of Public Schools, the President of the State University, and the Dean of the Agricultural College, shall be *ex officio* members of the State Board

of Agriculture, and the Governor shall appoint practical farmers to fill all vacancies as they occur in the corporate members of said Board of Agriculture. (Laws 1877, p. 5, § 8.)

SEC. 4045. *Officers to be elected, when—term of office.*—The officers of said Board of Agriculture shall be elected at the annual meeting of said Board. except those elected as provided for in section four thousand and forty-three, who shall serve for one year and until their successors are elected and qualified; and the offices of the Secretary and Treasurer shall be in the Agricultural College Buildings of the State University, in the town of Columbia, Boone county. (Laws 1877, p. 6, § 4.)

SEC. 4046. *Board to adopt by-laws.*—The Missouri State Board of Agriculture, and their successors, shall have power to adopt such by-laws and make such rules and regulations for the government of said Board and the management of its affairs and business, as they may deem best calculated to promote the interest of agriculture, and as shall not be inconsistent with the Constitution and laws of the State of Missouri and of the United States. (G. S. 320, § 5.)

SEC. 4047. *Annual meetings—membership.*—There shall be held in the Agricultural College Building aforesaid, on the first Wednesday of November, in each year, an annual meeting of the State Board of Agriculture, together with the president of each county agricultural society, or delegate therefrom, duly authorized, who shall for the time being be *ex officio* members of the State Board of Agriculture, for deliberation and consultation as to the wants, prospects and condition of the agricultural interests of the State, to receive the reports of district and county societies, and to fill by elections all vacancies in the Board. The President shall have power to call meetings of the Board when he may deem it expedient, and at any meeting of said Board, seven members shall constitute a quorum; and all meetings of the Board shall be held at the place of holding the regular meetings of the Board, in November of each year. (Laws 1877, p. 6, § 6.)

SEC. 4048. *Agricultural and Horticultural Societies to make report to Board.*—It shall be the duty of all agricultural and horticultural societies, organized and established in accordance with the laws of this State, to make a full report of their transactions to the Missouri State Board of Agriculture, at each annual meeting thereof. (G. S. 320, § 7.)

SEC. 4049. *Board shall make annual report to General Assembly—report shall contain, what.*—It shall be the duty of the said Board to make an annual report to the General Assembly of the State, embracing the proceedings of the Board for the past year, and an abstract of the reports and proceedings of the several agricultural and horticultural societies, as well as a general view of the condition of agriculture and horticulture throughout the State, accompanied by such recommendations, including especially such a system of public instruction upon those subjects as may be deemed interesting and useful. (G. S., 320, § 8.)

SEC. 4050. *Printing and distribution of annual reports of Board.*—The Public Printer shall, annually, under the direction of the President of the State Board of Agriculture, print fourteen thousand copies, of which two thousand shall be in the German language, of the annual report of the said Board of Agriculture; five hundred copies to be bound in cloth, balance in paper covers, to be distributed as follows: Twenty copies to each member of the General Assembly, fifty bound copies to the State Library, thirty copies to each county clerk for distribution among the farmers, as generally as may be, and the remainder to the State Board of Agriculture, to be distributed among the several agricultural and horticultural societies and farmer clubs of this State and other States, as the Board may direct: Provided, that said annual report shall not contain more than five hundred pages. (Laws 1875, p. 3, § 1.)

COUNTY AGRICULTURAL AND MECHANICAL SOCIETIES.

SEC. 4051. *Associations for the purpose of agriculture, etc., may be incorporated, when—powers, etc.*—Whenever fifty freeholders within this State shall present a petition to the county court of the county in which they or a majority of them reside, setting forth that they desire to organize and be incorporated for the purpose of promoting improvements in agricultural manufactures and the raising of stock, and the court shall be satisfied that such persons are freeholders of this State, the court shall, by an order, declare the petitioners incorporated for the purposes specified in this section, and thenceforth the petitioners shall be a body politic and corporate, by the name and style of the (naming it) county agricultural and mechanical society, and by that name they and their successors shall be known in law, have perpetual succession, sue and be sued, plead and be impleaded, defend and be defended, in all courts and in all actions, pleas and matters whatsoever, and shall have power to purchase, hold and receive any quantity of land not exceeding one hundred acres, with such buildings and improvements as may be placed thereon, and any other property, not exceeding in value fifty thousand dollars; and may, by vote, determine that thereafter the members of said society shall be composed of such persons as shall subscribe at least one share to the capital stock thereof, in shares not exceeding twenty-five dollars each; said shares to be personal property and transferable by agreement; but no transfer shall be binding on the society until reported to and approved by the board of directors. The amount of such capital stock shall, from time to time, be fixed by the stockholders or board of directors, provided the same shall, at no time, exceed one hundred thousand dollars, and may convey, lease, sell and dispose of the property of the society, or any part thereof, for the benefit of the society, and may have a common seal, and break and alter the same at pleasure. (Laws 1867, p. 3, § 1.)

SEC. 4052. *Directors to be elected, when—term of office—powers and duties—vacancies, how filled—who shall not be a director.*—Within thirty days from the date of the order of the county court, any number of the petitioners exceeding twenty, may proceed to organize such society by electing nine directors, who shall hold their offices one year and until their successors are elected; and the directors, when so elected, shall collectively form a board for the government of such society; and in such board shall be vested all the corporate powers and duties of every society incorporated as provided in this article; and for the purpose of electing the directors, there shall be held, annually, a general meeting of the members of the society. All vacancies in the board of directors shall be filled by appointment of the board. No person, not a member of the society shall be a director. (G. S. 321, § 2.)

SEC. 4053. *Directors to meet and select officers, when.*—Every board of directors shall assemble within twenty days after their election, and choose a president of their number, and some other persons as secretary, treasurer, collector, and such other officers, servants and agents as may be necessary, remove them from office and prescribe their duties; and all proceedings of the board shall be public. (G. S. 321, § 3.)

SEC. 4054. *Duty of officers.*—It shall be the duty of the president to preside at all meetings of the board and of the society, and in case of his absence, such other person as the members present shall appoint; and it shall be the duty of the secretary to keep a record of the proceedings of the directors and of the society;

and the treasurer shall give bond and security, to the acceptance of the board of directors, for the benefit of the society, in such sum as they, or a majority of them, shall determine, conditioned that he will faithfully receive and pay over, on their order, all moneys or other articles, the property of the society, that may come into his hands as treasurer, which bond shall be deposited with the secretary of the board of directors; and the said treasurer shall keep fair and accurate entries of all moneys and other articles by him received as treasurer, and from whom received, and to whom and for what purpose paid out, and make report of the financial operations of his office as often as he may be directed by the board of directors. (G. S. 322, § 4.)

SEC. 4055. *Majority of board a quorum—general powers.*—The said board, a majority of whom shall form a quorum, shall have power to make, ordain and adopt a constitution and all necessary by-laws, ordinances, rules and regulations for the government of the board of directors and of the society, and for the promotion of the objects for which it is designed; and the president of the board shall cause the same to be carried into effect; provided, such constitution, by-laws, ordinances, rules and regulations shall not be inconsistent with the Constitution and laws of the State. (G. S. 322, § 5.)

SEC. 4056. *Money to be appropriated, how.*—All moneys paid by members and others, and donations made to the society, shall be oppropriated, under the direction of said board, in conformity to such constitution, by-laws, rules and regulations as may be ordained and established for the government of the society, and for the advancement and encouragement of the objects of the society. (G. S. 322, § 6.)

SEC. 4057. *County court may appropriate money to the society, when.*—The county court of any county in which there shall be a society organized according to this article, or any special act of incorporation, shall have the power and may, if it shall be deemed expedient, appropriate out of the county treasury, for the benefit of the society, the sum of one hundred and fifty dollars in any one year; and the money so appropriated shall be drawn by the treasurer of the society on a proper warrant: provided, said money shall be annually awarded by the board of directors in premiums, or expended by them in the purchase of premiums, to be known as "the (name the county) court premiums." to be awarded according to the rules, regulations and by-laws of the society; and provided further, that not more than one such premium shall be awarded to the same animal or article of exhibition by the same county society. (G. S. 322, § 7.)

SEC. 4058. *Directors to report at each annual meeting—copy of report to be transmitted to State Board of Agriculture.*—At each annual meeting of the society, the board of directors shall report, in writing, the number of members and the financial condition of their society; the quantity and character of property owned by it, and the quality and cost of improvement of the same; the number and value of premiums awarded at their annual fair; the number and character of animals and articles exhibited; a statement of the probable quantity of the staple commodities of the county, and prices current thereof, and such other information in relation to the agricultural and mechanical interests of the county, as they may deem worthy of general notice; and a copy of the reports so made shall be transmitted to the Missouri State Board of Agriculture, to be disposed of as provided in the next succeeding section. (G. S. 322, § 8.)

SEC. 4059. *State board to report to General Assembly.*—The Missouri State Board of Agriculture shall, at each session of the General Assembly of the State of Missouri, report faithfully all the facts, statistics and information contained in the reports transmitted to them from the county agricultural and mechanical societies, organized and

incorporated under the provisions of this article, and such other facts, statistics and information as they may gather from other counties in this State in regard to agricultural, mechanical and domestic manufactures and productions, and to the raising of the various breeds of stock. (G. S. 323, § 9.)

SEC. 4060. *Property shall be held, for what purpose.*—The land and other property which may be held by any society under the provisions of this article, shall be held by the society for the sole purpose, and none other whatsoever, of erecting inclosures, buildings and other improvements calculated and designed for meetings of the society, and for exhibitions of various breeds of horses, cattle, mules and other stock, and of agricultural, mechanical and domestic manufactures and productions, and for the purchase and importation, and the keeping thereof, of such foreign breeds of stock as the board of directors may deem advantageous to the interests of the country. (G. S. 323, § 10.)

SEC. 4061. *Who shall be members.*—The members of any society, organized under the provisions of this article, shall be composed of such persons, and none others, as shall have subscribed their names as such in the books in which the proceedings of the society and of the board of directors are or shall be recorded, and paid annually to the treasurer of the society such sum, not exceeding five dollars in any one year, as may be established by the rules, by-laws and regulations of the society as a membership fee; and such persons shall be members only for the year for which they shall have paid such fee. (G. S. 323, § 11.)

SEC. 4062. *Order of incorporation to be recorded.*—A duly authenticated copy of the order of the county court, provided for in section four thousand and fifty-one, shall be filed and recorded in such manner as conveyances of land are, by law, directed to be recorded in the office of the recorder of the county, within three months after such order shall be made. (G. S. 323, § 12.)

SEC. 4063. *Constitution, etc., shall be printed, etc.*—The constitution, by-laws, rules and regulations of the society and board of directors shall be printed and circulated among the members of the society within thirty days after their adoption. (G. S. 323, § 13.)

SEC. 4064. *Property shall be sold, when.*—Whenever a majority of two-thirds of the members of any society organized under the provisions of this article, shall, at an annual meeting, declare such society dissolved; or if, from any other cause, said society shall be dissolved or fail to meet and pursue the objects of the society for the period of five consecutive years, then the real estate and all other property held by it shall be sold for cash in hand, at public auction, before the court house door of the county, after thirty days notice given in some newspaper published in the county, if there be one, and, if not, by ten printed advertisements set up in ten public places in the county, describing the property to be sold, and the time, place and terms of sale. Such sale shall be conducted by the directors, or a majority of them, chosen and elected as provided by this article. (G. S. 323, § 14.)

SEC. 4065. *Parties guilty of misconduct shall be arrested, etc., when.*—At any fair, show or exhibition, held by any incorporated agricultural and mechanical society, every person who shall, without the permission of the officers of such society, enter within any inclosure which may be used by such society as an agricultural and mechanical fair, and every person guilty of disorderly conduct, or such conduct as may interrupt or be prejudicial to the interests of such fair or exhibition whatever, within the inclosure for the same, or at a distance within two hundred yards of such inclo-
, shall be liable to immediate arrest by any officer of such society, and to the pay-

ment of five dollars to the society holding such fair, show or exhibition, to be recoverable at the suit of such society before any justice of the peace of the county in which such fair, show or exhibition may be held. (G. S. 323, § 15.)

SEC. 4066. *Societies may perpetuate their organization, when.*—All agricultural societies in this State, established under the act above cited, and that have failed to keep up their organizations as required by the law approved November 23, 1855, are hereby authorized and empowered to pursue the objects of such societies and perpetuate their organizations as though no failure to observe the law had occurred. (G. S. 324, § 16.)

PROCEEDINGS

OF THE

MISSOURI STATE BOARD OF AGRICULTURE.

AGRICULTURAL COLLEGE,
COLUMBIA, MISSOURI, November 3, 1880.

The Missouri State Board of Agriculture met according to law, and a quorum not being present, adjourned till the 10th inst.

10 O'CLOCK A. M., NOVEMBER 10TH, 1880.

The Board met, and, the President, John Walker, being absent, was called to order by G. C. Swallow, Vice-President.

J. P. McAfee and R. W. Gentry were appointed a committee on credentials, who reported the following persons present and entitled to seats, viz.: G. C. Swallow, K. M. Lear, R. W. Gentry, S. S. Laws and G. Husmann; also, W. N. Beaty, representing the Kansas City Exposition and Agricultural Fair Association; W. T. Hickman, representing the St. Clair, Bates and Henry County Association; J. P. Horner, representing the Cole County Agricultural and Mechanical Association; B. P. Bailey, Callaway County Agricultural and Mechanical Association, and Wm. Smith, Moberly District Agricultural Association. The report was received and adopted.

On motion of Dr. Laws, the acting president and two others were appointed a committee on order of business. The Board took a recess of fifteen minutes to give the business committee time to report.

After recess—The chairman of the business committee made the following report, which, on motion of Dr. Laws, was accepted, adopted, and the committee continued, viz.:

Prof. Meehan's address, Thursday at 9 A. M., in the University chapel, R. W. Gentry and E. C. More to follow with short addresses.

Prof. J. S. Blackwell's address Friday at 9 A. M., and N. J. Coleman and J. A. Hedges to follow with short addresses.

WEDNESDAY, P. M.

1. Secretary's report.
2. Treasurer's report.
3. Paper on sheep, by R. W. Gentry.
4. Paper on wheat, by S. M. Tracy.
5. Paper on millet, by C. H. Weber.
6. Paper on corn, by R. B. Maddex.

J. P. McAfee read a paper prepared, at the request of this Board, by Charles E. Prunty, of St. Louis, Missouri, on "The Varieties of the Cereal Oats," which paper drew out some additional valuable remarks from Prof. Tracy, agreeing in the main with the points brought out in the essay. He suggested as probably accounting for the superior qualities claimed for the "red rust proof oats," the fact that it was brought to this State from Texas, whilst other varieties usually grown here were originally brought from northern latitudes. Remarks were also made by Prof. Meehan, of Pennsylvania, suggesting that the qualities claimed for the "red rust proof oats" are justly claimed, it is a superior virtue, as no variety of oats has yet been introduced into Pennsylvania, which does not deteriorate in process of time.

R. W. Gentry suggested that the farmers of Missouri very much desired and stood in great need of information on this subject, and if this Board should succeed in furnishing this information, it will have accomplished an important work.

Mr. J. P. Horner remarked that he had spent several winters in Texas, and, whilst there, had learned that the army officials in that State would not purchase this variety of oats because it was claimed that horses feeding upon them soon aquired a cough which was supposed to be induced by the oats.

On motion, the essay was referred to the Secretary for publication.

On motion of Dr. Laws, Prof. Swallow was authorized to engage the services of Mr. J. L. Parrish, a stenographer, to take down the remarks of parties engaging in any discussions before this Board.

On motion of R. W. Gentry, the Board took a recess till 2:30 o'clock P. M.

AFTERNOON SESSION—2:30 O'CLOCK P. M.

The Board again convened and resumed business. The committee on credentials reported E. C. More coporate member and A. P. Clarkson, representing the Boone County Agricultural and Mechanical

Association; Z. S. Ragan, the Southeast District Agricultural Association; W. W. Batterton, the Ashley Agricultural and Mechanical Association, and Charles H. Weber, the St. Louis Agricultural and Mechanical Association, were present and entitled to seats, which was accepted and adopted.

The Secretary made a verbal report of his work for the year, which was accepted and approved.

The Treasurer made the following report:

COLUMBIA, MISSOURI, November 10, 1880.

To Missouri State Board of Agriculture, Columbia, Missouri:

GENTLEMEN: I herewith submit my account of receipts and expenditures since March 30, 1880, the date of may last report:

MISSOURI STATE BOARD OF AGRICULTURE, IN ACCOUNT WITH S. M. TRACY.

Cr.		
March 3, 1880, by cash on hand		$500 09
Dr.		
March 4, 1880, paid H. Eshbaugh, warrant No. 1	$18 60	
March 5, 1880, paid K. M. Lear, warrant No. 2	12 00	
March 5, 1880, paid S. M. Tracy, warrant No. 3	1 70	
May 10, 1880, paid E. W. Stephens, warrant No. 4	2 50	
May 29, 1880, paid Lewis & Nesbit, warrant No. 5	2 30	
June 30, 1880, paid S. M. Tracy, warrant No. 6	11 70	
August 4, 1880, paid freight, warrant No. 7	5 69	
August 16, 1880, paid freight, warrant No. 8	24 60	
August 17, 1880, paid freight, warrant No. 9	30 89	
August 30, 1880, paid Carter & Regan, warrant No. 9	22 10	
September 2, 1880, paid freight, warrant No. 11	2 15	
September 13, 1880, paid express, warrant No. 12	85	
October 9, 1880, paid W. S. Davis, warrant No. 13	2 50	
October 11, 1880, paid J. P. McAfee, warrant No. 14	18 90	
November 10, 1880, cash on hand	348 61	
		$500 09

We find the above and foregoing account correct.

E. C. MORE,
WM. T. HICKMANN, } Committee.

Carter & Regan, State printers, have presented a bill of $918.43 for printing the annual report of the Board of Agriculture and the State Horticultural Society for 1879. If this bill is divided in proportion to the number of pages occupied by each in the report, $674.72 should be paid by the Board of Agriculture and 243.71 by the State Horticultural Society. All other bills which have been presented have been paid.

I have received from the State Auditor a warrant for $1,250, but as the warrant has not been cashed by the State Treasurer, it is not included in the foregoing statement.

Respectfully submitted,

S. M. TRACY,

Treasurer Missouri State Board of Agriculture.

This report was, on motion, referred for examination to a committee consisting of E. C. More, Z. S. Ragan and W. W. Batterton.

R. W. Gentry, according to appointment of the Board, read an essay on "Sheep and the various breeds."

W. T. Hickman remarked that he had heard in some way that the Merino sheep is subject to "foot rot," if so, that is a very objectionable feature in them. He claimed to be something of an expert in the handling of wool, having dealt in it extensively, and that he considered the Merino about the best sheep and his favorite.

Mr. More stated that he was not at all inclined to take up the challenge of the writer of the essay; that he thought the essay a good one; that he had come to learn all he could upon the subject, but that he differed with the writer as to the best variety of sheep, although he did not know that he was right in doing so, as this breed is considered by sheep raisers to be a very valuable one; he did not like it, however, on account of its being so ugly; that he did not fancy them; that he was fond of the beautiful in the selection of stock. He asked, why not have beautiful sheep as well as beautiful horses and cattle? His favorite sheep is the Oxforddown and Southdown; thinks they are the handsomest sheep in the world. The Oxforddown is an improvement upon the Shropshiredown, and is handsomer even than the Southdown. The characteristic features of all these Down sheep are about the same. He agreed with Mr. Gentry, that the Merino raise their young better and are not so liable to disease, and keep themselves much cleaner. He thought those farmers who keep other breeds of sheep were most successful who keep small flocks and take good care of them, keeping them out of the rain.

Mr. Ragan stated that there is one point which he considered of vast importance, which was touched upon by Mr. Gentry; it is, that

every farmer should keep at least a few sheep. They are needed to keep down briars, sprouts and weeds, clean up the fence corners, and consume many things which would otherwise be nuisances. It would be well if many farmers who keep half a dozen dogs, would keep sheep instead, thus having the lambs for their tables and keep their farms clean and profitable. The great beauty of farming is to have every acre of ground productive of something. We have large acres of land that might be productive in blue grass, and keeping of sheep is the best way to bring it in.

Mr. Gentry said that the Merino sheep does not have a smooth and solid foot. It is possible that the Southdown has the best hoof of any sheep, but it depends on locality. In low, wet lands, foot rot is more prevalent than in any other place. On our high lands, I don't think you need to fear it at all. In the matter of weight of fleece, he had known three Merino rams, at three years old, whose fleeces, when cut, weighed respectively 31, 37 and 35 pounds. Their live weights were 108, 147 and 121 pounds. Now those sheep are the best which have a perfectly gummy coat, the oil being thrown out, because just inside the gummy coat the wool is clean, whilst those that do not throw out this quantity get really as dirty, but do not show it, besides interfering with the growth of the sheep.

The essay was on motion referred to the Secretary for publication.

Mr. Weber asked for further time in which to prepare his essay on "Millet," which was granted, and the paper, when prepared, was ordered referred to the Secretary for publication.

Mr. Weber stated that on his way to Columbia he stopped over at St. Charles, where he had the pleasure of getting acquainted with a young lady who had just returned from an extensive journey in South America, Miss Joanna Dyes. She had brought with her from Brazil a number of seeds, some of which she had given to him, but as he had no means of propagating them, he had brought them here, and in the name of the young lady would present them to this Board, that they may be propagated on the College Farm.

Prof. Swallow remarked that this donation, having been made to this Board, it may be appropriate to make some acknowledgment of a presentation so interesting.

On motion of Dr. Laws, that the thanks of this Board be expressed to this lady, with the assurance also that the seed will be passed over to the proper department of the Agricultural College, and that reports will be afterwards furnished her of the success of growing them.

The paper on corn experiments by Mr. Maddox was deferred on

account of his recent sickness, and when prepared, the Secretary was ordered to publish it in the Report of 1880.

The paper by Mr. J. C. Evans of Clay county, on Artichokes, was on motion referred to the Secretary for publication, when received.

Prof. Swallow stated that he was perfectly satisfied the artichoke is one of the cheapest articles of food for hogs during the winter that can be had. There are a great many waste places on the farm that can be planted with them, and the hogs be allowed to do their own digging. He felt satisfied also that artichokes will entirely eradicate hog cholera, as it is called. That on the College Farm cholera had existed every year, till the artichoke was introduced, and since that time it has disappeared. They were first planted in the orchard, and when they had sufficiently grown, the hogs were turned in and allowed to root for themselves. In this way the hogs got not only the artichokes, but also the fallen apples, and thus did great service in preventing the worms from cutting the trees. They were now growing them in rocky ground and on small islands in the creek bottoms that could not otherwise be utilized. Besides, they are extremely productive; one hill will yield a peck, and at this rate an acre would yield about thirteen hundred bushels.

Mr. Weber asked as to the effect of leaving them in the ground over winter, to which Prof. Swallow replied, they cannot be injured by freezing. After remaining all winter in the ground, they will grow again in the spring, though it is best not to rely upon volunteer growth, but plant every year. He had no doubt but that growing them on the same ground from year to year, the soil would be enriched thereby, as volunteer plants, coming up in the spring can be turned under.

The Jerusalem Artichoke seems to give the most satisfactory results.

On motion of K. M. Lear it was ordered that when the Board adjourn this evening, it adjourn to meet in the chapel of the University, at 9 o'clock A. M. to-morrow.

The committee on order of business made the following additional report for Thursday morning, viz.:

1. Papers on varieties of fruit and marketing same, by George Husmann and Z. S. Ragan.
2. Paper on rye and barley, by K. M. Lear.
3. Dairies and dairy stock, by O. Guitar.
4. At 2 o'clock P. M., election of officers.

The committee to whom was referred the Treasurer's report, asked for further time, which was granted.

The Board adjourned till 9 o'clock A. M. to-morrow.

9 O'CLOCK A. M., NOVEMBER 11, 1880.

The Board met in the rooms of the Agricultural College Building, at 10 o'clock A. M., having spent the first hour in the University Chapel listening to an able and interesting address by Prof. Meehan, upon the subject of "Practical Lessons from Botanical Science," and a short address by E. C. More and R. W. Gentry.

Mr. Lear, from the Committee appointed at the last meeting of this Board to report on the Agricultural College and Farm, stated that two members of the committee are absent, and asked that additional committeemen be appointed.

On motion, E. C. More and C. H. Weber were added to the committee.

A motion was made by Mr. More, which was adopted, limiting the time of service of the last named members of this committee to the present year.

The following paper was introduced by N. J. Coleman, and, on motion of Dr. Laws, was referred to the committee on legislation, viz:

The State Board of Agriculture now in session at Columbia, having considered the condition and wants of the State University, and of its various departments, commend most honestly to the General Assembly this institution of learning. It is now in a most flourishing condition, numbering about 540 students, and without room sufficient to accommodate well and comfortably more than from three to four hundred. The buildings need to be greatly enlarged and improved or new buildings erected if it is the purpose of the State to sustain the institution as it ought to be sustained, in order to meet in a respectable manner the pressing and growing wants of the young men and women of the State who are seeking the advantages of the best education.

The University is a State institution, it belongs to the people of the whole State, and the pledge in the Constitution and laws of the State to sustain it, and build it up, ought to be faithfully and sacredly carried out. Thus far the State has done but little for the institution, its means have come from other sources, and in an especial manner we commend to the General Assembly, and more particularly the farmers and mechanics who may be members of that body, the absolute necessity of making such appropriations for the benefit of the Agricultural and Mechanical department, for which, up to this time little or nothing has been done by the State. We regard this department as eminently worthy to receive assistance at the hands of the

State, practical as it is, in its aims and purposes, and founded in aid of the education of the farmers and mechanics of the country, far the most numerous, as they are the most necessary and useful members of society, and of the body politic.

The president stated that the committee on legislation, appointed at the last meeting of this Board, was expected to go before the approaching Legislature and ask for such legislation in behalf of this Board as may be deemed desirable and essential to the interests of the farmers of the State.

J. P. Horner moved that a committee of three be appointed who shall report to this meeting some plan for increasing the efficiency of this Board. Motion was carried, and J. P. Horner, N. J. Coleman and E. C. More were appointed said committee.

The committee on "fruits and the marketing of the same," asked for further time in which to make report; which was granted.

The paper on "Wheat and Experiments Thereon," was read by Prof. S. M. Tracy, and, on motion, referred to the Secretary for publication.

The Board then adjourned till 2½ o'clock P. M.

AFTERNOON SESSION—2½ O'CLOCK P. M.

The Board convened and took up the regular order of business which was the election of officers for the ensuing year.

The roll of members was called in question by Dr. Laws, and on his motion, was recommitted to the committee on credentials to revise and report, to which committee the name of George Husmann was added.

After a brief interval the committee submitted the following report, viz.:

We, the undersigned committee on credentials, report the following corporate members of the Board of Agriculture present: N. J. Coleman, R. W. Gentry, K. M. Lear, E. C. More, George Husmann.

Members *ex officio:* S. S. Laws and G. C. Swallow.

Delegates by proxy from county agricultural societies:

St. Louis Agricultural and Mechanical Association, C. H. Weber.

incorporated under the provisions of this article, and such other facts, statistics and information as they may gather from other counties in this State in regard to agricultural, mechanical and domestic manufactures and productions, and to the raising of the various breeds of stock. (G. S. 323, § 9.)

SEC. 4060. *Property shall be held, for what purpose.*—The land and other property which may be held by any society under the provisions of this article, shall be held by the society for the sole purpose, and none other whatsoever, of erecting inclosures, buildings and other improvements calculated and designed for meetings of the society, and for exhibitions of various breeds of horses, cattle, mules and other stock, and of agricultural, mechanical and domestic manufactures and productions, and for the purchase and importation, and the keeping thereof, of such foreign breeds of stock as the board of directors may deem advantageous to the interests of the country. (G. S. 323, § 10.)

SEC. 4061. *Who shall be members.*—The members of any society, organized under the provisions of this article, shall be composed of such persons, and none others, as shall have subscribed their names as such in the books in which the proceedings of the society and of the board of directors are or shall be recorded, and paid annually to the treasurer of the society such sum, not exceeding five dollars in any one year, as may be established by the rules, by-laws and regulations of the society as a membership fee; and such persons shall be members only for the year for which they shall have paid such fee. (G. S. 323, § 11.)

SEC. 4062. *Order of incorporation to be recorded.*—A duly authenticated copy of the order of the county court, provided for in section four thousand and fifty-one, shall be filed and recorded in such manner as conveyances of land are, by law, directed to be recorded in the office of the recorder of the county, within three months after such order shall be made. (G. S. 323, § 12.)

SEC. 4063. *Constitution, etc., shall be printed, etc.*—The constitution, by-laws, rules and regulations of the society and board of directors shall be printed and circulated among the members of the society within thirty days after their adoption. (G. S. 323, § 13.)

SEC. 4064. *Property shall be sold, when.*—Whenever a majority of two-thirds of the members of any society organized under the provisions of this article, shall, at an annual meeting, declare such society dissolved; or if, from any other cause, said society shall be dissolved or fail to meet and pursue the objects of the society for the period of five consecutive years, then the real estate and all other property held by it shall be sold for cash in hand, at public auction, before the court house door of the county, after thirty days notice given in some newspaper published in the county, if there be one, and, if not, by ten printed advertisements set up in ten public places in the county, describing the property to be sold, and the time, place and terms of sale. Such sale shall be conducted by the directors, or a majority of them, chosen and elected as provided by this article. (G. S. 323, § 14.)

SEC. 4065. *Parties guilty of misconduct shall be arrested, etc., when.*—At any fair, show or exhibition, held by any incorporated agricultural and mechanical society, every person who shall, without the permission of the officers of such society, enter within any inclosure which may be used by such society as an agricultural and mechanical fair, and every person guilty of disorderly conduct, or such conduct as may interrupt or be prejudicial to the interests of such fair or exhibition whatever, within the inclosure for the same, or at a distance within two hundred yards of such inclosure, shall be liable to immediate arrest by any officer of such society, and to the pay-

ment of five dollars to the society holding such fair, show or exhibition, to be recoverable at the suit of such society before any justice of the peace of the county in which such fair, show or exhibition may be held. (G. S. 323, § 15.)

SEC. 4066. *Societies may perpetuate their organization, when.*—All agricultural societies in this State, established under the act above cited, and that have failed to keep up their organizations as required by the law approved November 23, 1855, are hereby authorized and empowered to pursue the objects of such societies and perpetuate their organizations as though no failure to observe the law had occurred. (G. S. 324, § 16.)

matter were utilized by being fed to stock, and any work that is susceptable of any good result in a financial way must do likewise.

Now, if a flouring mill or a slaughter house should fail to find sale for the bran and refuse matter, it would largely curtail their profits, so in the manufacture of sugar and syrups, everything must be turned to account in order to secure satisfactory results. Therefore, the cane should not be stript of the blades and seed in the field, but used to feed the stock. There is no oil in the seed, but at least twenty-five per cent. starch, sugar and a very little fiber.

G. C. Swallow remarked that the farmers were reduced to about four articles that bring them money, and if we can add another article that will pay as much as either of the others, let us have it. Wherever we can make corn we can make cane, and as our experience is this year, we can make good cane when corn is a failure.

Mr. Lear asked for further time to prepare his paper on rye and barley, which was referred to the Secretary for publication when received.

Mr. Hedges extended an invitation to the members of this Board to attend a meeting of the "Cane Growers Association," which will meet in St. Louis, Missouri, on the 21st of December, prox.

On motion of Prof. Husmann, the invitation was accepted with thanks.

The paper of Gen. Guitar on "Daries and Dairy Stock," was referred to the Secretary for publication; also the paper of Geo. Longman on "Cattle of Missouri."

The paper of C. E. Leonard on "Short Horn Cattle" was similarly referred.

The Secretary was directed to notify Col. Coleman of the request of this Board, that he should prepare a paper on "Horse" for publication in the next report.

The Board then took a recess till 2½ o'clock P. M.

AFTERNOON SESSION—2½ O'CLOCK P. M.

The Board convened and resumed business.

G. C. Swallow offered the following notice: "I hereby give notice that at the next meeting of this Board, I will move a by-law, that any corporate member who shall be absent at two successive meetings, one of which shall be the annual meeting, shall forfeit his membership, and the Board may declare a vacancy in consequence thereof.

The paper of J. R. Estill of Howard county, on "Grasses for Grazing and Hay" was read and referred to the Secretary for publication; also the paper of J. L. Erwin on "Winter Dairying."

The Board received with thanks the invitation of Mr. Erwin to visit "Mineral Spring Dairy."

The Secretary was instructed to ask Mr. Meehan for a copy of his very instructive address for publication.

On motion of Prof. Husmann, the committee on legislation was instructed to ask the next Legislature to amend the law in regard to publishing the proceedings of this Board, so as to have a less number of copies published entire, and that the most valuable papers embraced therein be published separately for distribution at a less rate of postage.

Mr. Gentry moved that the committee appointed at the last meeting on the College Farm, be not a standing committee, and that it be discharged. Motion carried.

Prof. Swallow announced from Prof. Ficklin an invitation to visit the Observatory, which was received with a vote of thanks.

On motion of J. P. Horner, a special committee was appointed to investigate the condition of the Agricultural College, and make such suggestions to those managing the College as they may deem expedient, and make a full report of its condition and wants at the next annual meeting of this Board. Jno. Walker, J. P. Horner and N. W. Wilson were appointed said committee.

Mr. More offered the following, which was adopted:

Resolved, That the committee on legislation be requested to urge upon the General Assembly of Missouri at its next session, the necessity and propriety of appropriating at least the sum of twenty thousand dollars for the purpose of erecting, purchasing and putting into practical operation, a building, machinery and works on the College Farm, for the making of sugar and syrups out of sorghum.

Mr. Lear offered the following, which was adoped:

Resolved, That the committee on legislation be requested to urge an appropriation of ($10,000) ten thousand dollars, by the next Legislature, to defray the expense of an agricultural exhibit from Missouri, at the World's Fair in New York in 1883.

On motion of E. C. More, the bills examined by the committee on Treasurer's report, were reported correct, and ordered paid.

On motion of Maj. N. W. Wilson, Mr. Hedges was added to the committee on exhibition of the products of agriculture before the next Legislature, and that he be requested to have on exhibition as complete a sample of sugars and syrups as possible.

On motion of Col. More the executive committee was requested to assist the secretary in preparing a list of questions eliciting informa-

tion in regard to the products, resources and improvement of the various counties of the State.

Prof. Tracy, from the committee to attend and make exhibit of the agricultural products of Missouri, at the National Millers' Association at Cincinnati in June last, reported the duty performed, and that the first premium had been awarded to Missouri.

The thanks of the board were extended to Prof. Tracy for his faithful discharge of this duty.

W. T. Hickman and R. W. Gentry were added to the committee on treasurer's report instead of W. W. Batterton and Z. S. Ragan.

On motion a warrant for ($100) one hundred dollars was ordered drawn on the treasury for defraying the expense of exhibition of agricultural products before the Legislature at its coming session.

The Board then adjourned this annual meeting till November 22d at 10 o'clock A. M.

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10 O'CLOCK A. M., NOVEMBER 22, 1880.

The Board met, a quorum not being present, and adjourned till the 29th inst., at 10½ o'clock A. M.

AGRICULTURAL COLLEGE BUILDINGS,
November 22, 1880.

The Board met, and the Secretary was directed to read the minutes of the proceedings of this Board for the present annual session; which were immediately adopted.

On motion of Col. More, the amendment to the by-laws offered by G. C. Swallow was adopted.

On motion of Col. More, the following resolution was adopted:

Resolved, As the sense of this Board that the salary of James P. McAfee, Secretary of this Board during the year 1878, amounting to $6090, should be paid out of the State funds without further delay—his services in that regard having been long since performed and received—and appropriated by the State of Missouri, and the Committee on Legislation is hereby instructed to take proper action in the premises.

On motion of J. P. Horner, a warrant was ordered drawn on the treasurer for the sum of ($5.00) five dollars for postage and stationery, in favor of the Secretary.

On motion, the Committee on the College Farm was requested to meet and make report to the Executive Committee prior to the approaching meeting of the Legislature.

Col. More moved that this annual meeting of the Missouri State Board of Agriculture do now adjourn to meet again on the first Wednesday of March, 1881. J. P. McAFEE, *Secretary.*

AGRICULTURAL COLLEGE ROOMS,
March 2, 1881.

The Board met pursuant to adjournment, and J. P. Horner was appointed Secretary *pro tem.* Prof. Swallow, J. P. Horner and W. N. Beattie being the only members present, an adjournment was ordered till the 14th inst. J. P. HORNER, *Secretary pro tem.*

AGRICULTURAL COLLEGE ROOMS,
MONDAY, March 14, 1881.

The Board met pursuant to adjournment. The minutes of the last meeting were read and approved.

On motion of W. N. Beattie, an account of $5.15 in favor of G. C. Swallow for express charges paid by him, was allowed and ordered paid by the treasurer.

On motion of J. P. Horner, the Board took the following action:

Resolved, That the treasurer is hereby authorized and requested in the interim of meetings of this Board to pay such necessary expenses as may occur from time to time, as freight bills, express charges and postage and stationery expenses, as may be ordered by a majority of the Executive Committee.

On motion of Prof. Husmann, a committee of five was appointed, and the sum of three hundred and fifty dollars appropriated from the treasury to meet the necessary expenses, (provided the amount granted

for current expenses of this Board is increased by the Legislature, now in session at the Capital), of holding a trial of reapers and mowers during the coming season.

The following gentlemen were appointed said committee: John Walker, N. J. Coleman, J. P. Horner, Burch Hunt and W. T. Hickman, and on motion, G. C. Swallow was added to this committee.

On motion of Col. More, the officers of the Agricultural College and the Boone County Agricultural and Mechanical Society were invited to co-operate with this Board in holding said exhibition.

On motion, the Secretary was directed to call the attention of Jno. Walker to the action of this Board, asking an amendment to the law requiring 14,000 copies of the report of this Board to be published, so that 5,000 copies may be printed in full, and in lieu of the remaining number the Board be authorized to print special parts deemed of value, separately, so as to secure distribution at a less rate of postage.

On motion of Col. More, the Board adjourned till the first Wednesday of June, 1881. J. P. McAFEE, *Secretary.*

AGRICULTURAL COLLEGE ROOMS,
June 1, 1881.

The Board met pursuant to adjournment, Hon. John Walker in the chair.

The object of this adjourned meeting was the completion of arrangements in reference to the proposed trial of reapers and mowers. It is ascertained that the appropriation of money for the use of this Board by the Legislature is not sufficient to meet the expense; this subject is therefore dismissed.

The Board then proceeded to arrange a programme of business for its annual meeting in November next.

N. J. Coleman was invited to prepare a paper for next report on "The horse, various breeds, merits, etc."

Odon Guitar, on "Jersey cattle, and their points of value."

John Walker, on "The feeding of stock for fattening purposes."

Mr. Jewett, of Jackson county, on "Fine wool sheep, their breeding and points of value."

R. M. Bell, a paper on "Long wool sheep, their breeding and points of value."

The secretary was directed to inquire among breeders of short-orn cattle, and secure, if possible, an essay on this breed of stock for ext report.

A. P. Clarkson was requested to prepare a paper on "Red clover, s advantages and proper use for profit."

On motion the Board adjourned till the next regular meeting in lovember.

J. P. McAFEE, *Secretary.*

ESSAY ON THE VARIETIES OF THE CEREAL OATS, ADDRESSED TO THE MISSOURI STATE BOARD OF AGRICULTURE, COLUMBIA, MISSOURI.

BY CHAS. E. PRUNTY.

ST. LOUIS, MO, Nov. 1, 1880.

The cultivation of this much esteemed grain is restricted in our climate of Missouri, on account of their poor yield, owing partly to our warm climate, and on account of the use of varieties which only thrive in colder and more humid regions.

Of the six or eight varieties raised in Europe and in different parts of the United States, the one usually sown here in Missouri is the common black oats.

It comes from Eastern British America by various names, such as Tartarian, Hungarian, Siberian, and Norway oats.

It is most generally sown on account of possessing a stiff straw, but in time as it becomes acclimated, the grain becomes gradually lighter, and the straw long and soft, so that at harvest it easily falls down and tangles, rendering the crop very difficult to gather.

The common white oats is sown on poor land, near the city of St. Louis, on account of yielding a long straw, and is fed as sheaf oats.

The Potatoe, Barley or Surprise oats has been raised in Missouri for about twenty years. It produces a long, stiff straw, but gradually the grain degenerates; it is now almost abandoned as a grain crop.

The short oats, sometimes called Egyptian, black or black winter, is better suited to our climate than either of the above mentioned varieties. It yields a good crop of heavy, plump grain, and does not degenerate in this region. The objections to it are that the straw is short, and the grain shells easily if it is allowed to become over ripe before cutting the crop; and as oats are usually followed by a crop of wheat here, the scattered grains grow voluntarily among the wheat, consequently the product consists of a mixture of plump oats and

rheat, which is difficult to separate with fanning mills. Hence this therwise desirable variety of oats is not commonly raised here.

The hulless or naked oats has been tried to some extent for the ast few years, but as the straw is so short, it will hardly ever be cultivated extensively here, where oats are so much fed in the sheaf.

The variety of oats which yields the best results here, is the Red Rust Proof, or Tawny oats, so called because it is not affected by the ed rust.

The grain is of a white or tawny color, heavy and mealy, and has roduced for the past six years about twice as many bushels of grain o the acre as any other variety.

The straw is sufficiently long to make a good sheaf, and is stiff nough to stand during our sultry harvest weather. This variety is nore extensively sown in the southern States than it is in Missouri.

In conclusion, it is not commendable in our Missouri agriculturists, hat they do for years grow crops, which are twice as exhausting on heir lands as the Red Rust Proof oats, and which yields less money, rithout ever giving them a fair trial.

SHEEP—THE VARIOUS BREEDS.

BY R. W. GENTRY, SEDALIA, MO.

Our subject confines us to an account of the present recognized breeds of sheep, their history, characteristics, merits and demerits.

The division usually made in the catalogues of our fairs is a general one consisting of long, middle and fine wools.

The chief long wooled breeds are the Cotswold, Leicester and the Oxforddown. The Lincoln, Romney, Marsh and others are still too local to be of importance. By far the most numerous and important of long wools in this country is the

COTSWOLD.

This is called an English breed, and is supposed to have originated in England. It is said to have been introduced from Spain, in the time of Henry II. The whole question, though, is a matter of speculation.

The description of a well-bred Cotswold, according to Stewart, is as follows: "The face and legs are white but sometimes dashes of brown or gray, derived from the original stock, may be found on both face and forelegs. The head is strong and massive, with sometimes a Roman nose, without horns, and having a thick forelock of wool upon the forehead. The neck and forequarters are not so square and heavy, nor the brisket so prominent as in the best Leicester, but the hind quarters are square, full and broad, and the thigh solid and heavy. The back is straigt and broad, and the ribs well sprung, giving a round body; the flanks are deep; the legs are clean, of moderate length, but the bone is not so fine as in the Leicester. The general style and appearance is good and attractive, and indicative of a vigorous, active and hardy animal and a prime mutton sheep. The style of wool has changed from straight, plain wool to ringlets.

The alleged merits of the Cotswold are that it is a valuable mutton sheep, being so large and easily fattened and maturing young; it is prolific, a good nurse and produces lambs active and hardy; the wool

is very long and adapted to so many different kinds of manufacture that it generally commands the highest price in the markets. It is also a valuable breed in producing crosses.

The demerits of the Cotswold are that it is delicate as compared with the middle and fine wools; indeed, this objection is common to all the long wools. They cannot be put in large flocks without great and certain loss. This is now an admitted fact, though never satisfactorily explained.

Another thing which makes this breed delicate, as compared with the downs and fine wools, is that the wool is open and often parts along the backbone, thus exposing that tender part to the snow and rain. Breeders are, however, trying to remedy this, and with some degree of success. Another famous long wooled breed is the

LEICESTER.

This breed, also, is English. The old Leicester was a coarse, slender and indifferent sheep, and not till Mr. Bakewell improved the breed did it assume any importance. It was about the middle of the last century that this gentleman undertook to produce an ideal mutton sheep. This sheep was called the New Leicester, a sheep very similar to the Cotswold, except that it is heavier in build and more symetrical and stylish in appearance.

Mr. Youatt, writing some years ago of this breed, says: "It is without a rival; in fact, it has improved if it has not given the principal value to all the other long wooled sheep." The chief claim for it is that it is the most profitable mutton sheep. For practical purposes, however, it cannot be recommended to the average farmer until it becomes hardier and able to thrive upon average pasture. As at present, its delicacy as to food and shelter, and its inactivity, confine it to particular localities.

THE OXFORDDOWN

Is somewhat between the long and middle wools, belonging hardly to either. It is the result of a cross of a Cotswold ram on a Hampshiredown ewe. The Hampshiredown originated in a cross of a Southdown ram on a white-faced native breed. This breed, therefore, is a mongrel. It is said to be a valuable mutton breed, possessing the characteristics both of the Cotswold and Southdown. In England it flourishes upon low lands, where these breeds do not. It is just now being imported to this country and we are not prepared to pass upon its merits and demerits.

MIDDLE WOOLS.

The most important of the middle wools, both as to age and numbers, is the

SOUTHDOWN.

The name is derived from a long range of chalky hills extending from Norfolk to Dorchester, England, on which the Southdown has been reared for centuries. "This breed," says Mr. Ellman, "was formerly of small size, and far from possessing a good shape, being long and thin in the neck, high on the shoulders, low behind, high on the loins, down on the rump, the tail set on very low, sharp on the back, the ribs flat, narrow in the forequarters, but good in the leg, although having big bones." The breed is now much improved in shape and appearance. It is of medium length of body, broad and straight on the back, with the tail set high up, broad across the hams behind, full in the girth, ribs round, neat and symmetrical in the neck, head and legs; holds the head erect and is quick and graceful in its movements. The wool is short and of medium fineness, though harsh, and covers the body and legs half-way. From the knee and hock down is a furry covering of dark brown or black color. This seems to have become a permanent characteristic, as all efforts to get rid of it have failed. They sometimes breed entirely black; they are hornless, though small horns are rarely met with.

The merits of the Southdown are its superior mutton qualities and its healthfulness. It matures earlier, perhaps, than any other breed, except the Leicester, going to the butcher at two years old and even younger. It is prolific and the lambs are active and hardy. The breed is very active and thrives on short keep. It is seldom, if ever, subject to foot-rot or hydatid on the brain. The wool has been relieved of much of its harshness, and is of that class which often brings the highest prices.

The chief objection to the Southdown is its lightness of clip. The wool is very deficient in oil, which renders it harsh and brittle.

The tendency to a black color is also objectionable, as that color is docked in the markets. The latest importations are much better wooled. The Southdown is not so large as the long wools, and is for that and other considerations, the superlative mutton sheep.

Another middle wooled breed now being imported into this country is the

SHROPSHIREDOWN.

This breed originated in England about 1792. It consists of a mixture of Cotswold, Leicester, Southdown, and what was known as the sheep of "Morfe Common." They resemble the Southdown in size and appearance, except that the wool is about twice as long and more glossy, and the face and legs jet black. It yields heavier fleeces than the Southdown, and is said to be fine mutton. It is comparatively a stranger in this country, but eminently deserving of a trial.

FINE WOOLS.

Next, in our arrangement, comes the fine wools, or the Merino. This breed of sheep is known to have existed in Spain as far back as the Christian era. We know nothing of it prior to this time. The Spanish Merino continued very much the same from the earliest times down to the eighteenth century. In 1765 a number of them were imported into Saxony, and from these, under a certain course of breeding, are descended the "Saxon Merino," a small, plain, delicate sheep, with naked belly and legs, bearing a short fleece of fine wool.

In 1786 an importation was made from Spain into France. From these, under another course of breeding, is descended the French Merino, a large and often reindeer-like sheep, having an entire covering of light, fine wool.

In 1802, Col. Humphreys, then our Minister to Spain, sent to this country an importation of Spanish Merino sheep. From these and others are sprung what are called "American Merinos;" or more properly, "Improved Spanish Merino."

The best works state that each of these types differs from the others and from the original. They state also that the Spanish sheep of to-day differs very little from that of the past. That country seems either to be satisfied with the sheep as it is, or to be unable to improve it. Had we before us photographs of the typical Merino in this country taken decennially since 1800, we would be astonished at the wonderful evolution brought about by the far seeing ingenuity of American breeders. Almost the whole secret consists in having a definite ideal in view and coupling males and females that will produce that ideal. Climate and keeping, though of vast importance, are subordinate to this.

For our typical Merinos we must look to Vermont. This State enjoys a prestige which a century may not overcome.

The typical Vermont Merino of to-day is one weighing, in breeding condition, bucks, 130 pounds or more; ewes, 100 pounds or more. He should have a head of medium size, muzzle clear, forehead broad, ears soft, thick and set wide apart. Horns, on the ewe, none; on the ram, well turned, set not too closely to, nor too far from, the head and neck. The neck should be short on top and long below, strongly set to the head and shoulders, becoming deeper toward the shoulders. The shoulders should be broad and well placed, the chest deep, the barrel round and full; the back short and straight; the tail set on a level with the back; the hind quarters broad laterally and flank full; also broad behind, and the outline from tail to ground a perpendicular. The legs should be short, straight, wide apart and strong. There should be folds encircling the neck, very large underneath, and decreasing upward; should be wrinkles on the shoulders, belly, flanks, thighs and root of tail. The fleece should cover the entire body, neck and legs and all of the head except horns, eyes and muzzle. The wool should be from two and a half to four inches long, fine, well crimped, strong, dense, white, full of free oil *and as uniform as possible in quality.*

Ewes need not be quite so wrinkley nor oily as rams.

The claims of the Merino are that they are healthier, hardier, and will do better on scant keep than any other breed; are better protected by their thick, oily fleece from the weather than any other; are the only good sheep that will flock together in unlimited numbers and do well; are for wool purposes the best cross on all other breeds; are pre-eminently the wool producing sheep, and, therefore, the most profitable. The only thing lacking in the Merino is that it matures too late to be the most profitable mutton sheep. It is, however, the most palatable mutton of all, the fat being better distributed than in others.

Wool and mutton antagonize each other, and we cannot, therefore, combine in any one breed, both these in the highest degree. Of the two, wool is, to most sheep men, by far the more important. For this reason and because of the smaller percentage of losses from all causes, we decidedly prefer to invest our money in Merinos. For the wisdom of breeding them so oily and wrinkley as they now are we refer you to the Vermont Register, Vol. I, where the whole question is clearly stated and the arguments fully adduced.

In conclusion, without worrying your patience by commenting on the absolute stupidity of the majority of the farmers as shown in their clinging to mongrels and scrubs instead of good stock, and in their being indifferent to a thousand details of this the surest and most

profitable stock business in the world, we quote an extract from the report of the jurors on Merinos at the Centennial:

"Fully three-fourths of the territory of the United States is well adapted to wool growing, and wool is destined, in the near future, to become one of the leading staples of export.

"The question, then, as to which is the best sheep for general purposes in our country, assumes an importance of large proportions. In awarding this position to the "American Merino," we think we are fully borne out by the following facts and conclusions: The climate of our country is a variable one, subject to great extremes of temperature, requiring animals of great hardiness of constitution to enable them to endure its frequent and sudden changes. Furthermore, our agriculture is still in a rude and transition state, few of our citizens being in possession of the necessary facilities required for the successful rearing and keeping of the large mutton breeds. Again, that portion of our country best adapted to sheep and wool growing is still almost a wilderness, a grand expanse of nature, and must remain such for many years to come unless utilized by the culture of some race of animals so hardy as to be in a measure self-sustaining and at the same time profitable to their owner.

"Such an animal, we claim, is the 'American Merino,' as now bred among us—a sheep of fair size, compact in carcass, symmetrical in form, possessing a strong constitution, and carrying a fleece of great density, weight and value, covering the sheep in every part where wool ought to grow, thus protecting every part of the body from climatic influences, a sure breeder and a fair nurse. As a working sheep, it is capable of living on short pasturage and scanty fare, easily herded, and the only good sheep which can be profitably kept in large flocks—a sheep which fills more nearly all the requirements which the condition of our country and people demand than any other known breed."

WINTER DAIRYING IN MISSOURI.

The essentials for success in winter dairying are good cows; stopping their calves at a proper time; good food, water and shelter; good care, both of the cow and milk, and a good market.

To show you that we have, or can have, these points, is the object of this paper.

During the past five years I have made careful and frequent comparisons of the average yield of milk and butter of the different dairies within my knowledge in this State, as compared with dairies of similar size in New York, Ohio, Illinois or Wisconsin, and find we do not suffer by the comparison. In my own dairy I am unable to give the exact yield of butter, because a very considerable portion of the milk is marketed without skimming.

I am keeping about fifty cows this year; average about forty in milk; will make 6,000 pounds of butter which I have engaged at 25 cts.; will sell about $150 worth of cream, and will retail about 6,000 gallons of sweet milk at an average of five cents per quart. The cream and milk converted into butter would make at least 2,000 pounds more, or about 200 pounds per cow; the actual is above rather than below, making $50 to the cow for butter. The calves are worth, at four months, an average of $10 per head and are readily raised on skim milk with a little linseed meal added.

My estimate of the cost of keeping a cow is $40 per head; this includes labor. If good selections are made the cows are worth first cost for beef when fatted. The value of the manure is worth more than the interest on the money, deterioration of improvements, etc., etc.

Manure is better than a compound interest note because it adds to the principal without any danger of the maker becoming worthless.

My judgment still adheares to the short horns and grades. The proper time for calving in this latitude is September. The cows have rest during the hot months of July and August. My September calves of 1879, sold for $21 per head in August, 1880. Calves are readily wintered that are kept growing during the fall. The greatest enemy we have to good food is weeds; weeds spoil the fine flavor of our summer butter. If the hay is made at the proper season and reasonable care taken, it is comparatively free of weeds. The October and November pastures are free as well as the May and June. The average mildness of our winters makes it comfortable for our cows out doors during most of the day, giving the cow plenty of exercise and pure air;

good water we can have either by wells or ponds, so arranged that the water will be supplied automatically in a trough without waste or the animal rendering the water filthy. It is useless to undertake winter dairying without a good convenient barn; my preference is stone; it is warm and substantial; a good manure cellar beneath allows a free circulation of air, keeps the floor dry and also the yard, as well as saves a great deal of labor.

Good care means regularity in feeding, watering and milking, keeping the cow as clean as possible, doing all that can reasonably be done for her comfort, milking in a cleanly manner, keeping all the milk-vessels and milk-room clean. With my experience above and below the ground for a milk-room, I much prefer *above ground.*

The same expense will make a room above ground equally cool in summer and warm in winter; in either case we must heat or cool artificially, and above ground we have so much less moisture to contend with; cleanliness, ventilation and drainage are all in favor of the milk-room above ground.

MARKET.—I am not able to supply half the demands for butter at 25 cents net per pound by the year. Butter can be safely shipped in ordinary packages from October to May with little risk. Last winter I used a common lard can, tin, with good success; the can was returned for refilling; I shipped direct to consumer. Such has been the increased demand for good butter in our little local market that during the entire summer I have had no surplus.

A reference to my books shows the months of November, December, January and February to be as favorable or more so than any in the year for a large yield of butter. Cows that are well wintered get a new coat of hair in March; this thins the milk as the food goes into this coat.

J. L. ERWIN.

GRASSES FOR GRAZING AND HAY.

BY J. R. ESTILL.

Mr. President and gentlemen of the Board of Agriculture :

Your Secretary has notified me of my appointment as committeeman to prepare a paper on "Grasses for grazing and hay, of our State."

My business in life has been farming—dealing in facts rather than fancies, trying to learn something myself, rather than teach others. Being proud of my adopted State, and realizing her capacities, the highest ambition of my life has been to aid in developing them.

If in an experience of more than forty years in Kentucky and in this State, I have gleaned anything worth preserving, it will be most cheerfully contributed.

There could not be presented to a Missouri farmer a more interesting subject for reflection and experiment than her grasses. The most important of these are blue grass, clover and timothy. The subject is most interesting, presenting, as it does, so many phases of labor, immediate returns, with the renovation and preservation of the soil.

Blue-grass is our leading and most valuable grass. It is to the agricultural world what gold is to the financial—rich, succulent and nutritious, keeping stock fat the year round.

It is valuable also in preserving the soil from washing, springing up everywhere, in the lanes and byways, and holding its own with the tenacity of life. It is valuable as a grazing grass in another respect; it pushes up from the bottom in its growth. Cut off a blade two inches long—go to it in a week, there will be the same square crop, but three inches long; it is ready to be eaten again, without waiting for laterals to shoot out.

In the early settlement of our State, blue-grass did not succeed well; the soil was too mellow and porous, but as the soil was cultivated and became more compact, blue-grass grew spontaneously. I

order to secure its growth in the timbered lands, it is only necessary to deaden sufficient timber to allow the entrance of the sunshine.

When putting cultivated land in blue-grass, it may sometimes succeed sown in winter, but the best time is in the month of September. Prepare the ground well, and sow it alone, or it can be sown with rye or wheat. To make it strong and healthy keep the sun on the young grass, by grazing it off in the spring.

When it is desired to obtain the largest amount of grazing at once, timothy and clover are sown with it; this makes a fine pasture, but blue-grass will overcome all other grasses and take complete possession of the soil. When a good sod is once formed, it goes on improving from year to year; it enriches the land and affords more grazing. In the older States, where the land has been in blue-grass for forty and fifty years, it is a well conceded fact with farmers, that its value is greatly enhanced thereby.

The hardy nature of this grass makes it come on very early in the spring. A bright warm day in February will give the young blades a start; they will then be improved by every day's sun. The seed makes its appearance about the first of May, and ripens by the last of the month; stock are very fond of it, and they fatten on it almost as well as on an oats field. The usual way of saving the seed in our State is by stripping it or by tacking a piece of muslin on the back of a grain cradle, and preserve it in bundles. These can be passed through a common cutting box; it answers the purpose very well for home use.

In Kentucky blue-grass seed is becoming quite an article of commerce. A simple machine is constructed by which a boy and a horse can save from one to two hundred bushels of strips per day, yielding from two to ten bushels per acre, varying according to season and sod. This is spread upon a barn floor or shed, to dry for a few days.

The demand for this seed from the various countries of the old world has increased very rapidly within the last few years. It has become necessary to establish steam factories for cleaning it from strips to clean seed. It is subsequently pressed into small square sacks or bales, and is then ready for shipment. Orders come chiefly from England, Germany and Russia, one firm having orders for a hundred thousand bushels last season.

It is a mooted question as to whether this State will produce blue-grass equal to the best Kentucky lands. I have seen some fall crops here that were as thick and compact as a mattress and fully equal to the best Kentucky crop. There can be no doubt that as the lands settle by cultivation and the tread of stock, it will continue to improve.

Our best farmers are rapidly adopting the theory which prevails in all the older States—"more grass and less ploughing." It preserves the soil, there is less expense for labor and larger returns from the investment.

When lands are tired and need quick and thorough renovation for cultivation, we have no grass equal to red clover. It makes a heavy crop, completely shading the ground. The large and vigorous roots penetrate the soil to the depth of several feet; from this fact it stands drouth better than any other grass. It is the best grass for the grazing of hogs, putting up early in the spring and remaining green and tender throughout the season.

When every item is taken into account there are few crops more valuable to the farmer than red clover, for grazing or for hay, for renovation of the soil and a crop of seed. If a crop of seed is desired, it should be cut or the stock taken off from the 10th to the 15th of June, as the second crop makes the best seed. The yield of seed varies from two to four bushels per acre, according to the stand and season. There is frequently great difficulty in getting a good stand of clover; although the plant is strong and vigorous when once firmly rooted, it is very tender and sensitive before the germ attains any strength and the rootlets become fixed in the soil—a slight frost at this period will kill it. To start the plant early enough in the spring, to have it strong and thrifty before the hot weather sets in, and late enough to escape the frosts, requires good judgment; even then something depends on luck. Some of our most experienced farmers sow between the 20th of March and the 1st of April.

I do not attach as much importance to the exact quantity of seed sown to the acre as do most farmers. If the plants do well, a gallon of seed to the acre will entirely cover the ground, but if there should be late frosts, or the season unfavorable, two gallons will not insure a crop.

The usual custom is to sow in the spring on weat or oats; with a favorable season this does very well, but it is not so sure as to sow it alone or with some small grain crop, which is grazed off to prevent shading the young plants.

Clover hay is almost indispensable for dairy cows, keeping up the flow of milk during the entire winter, and it is an excellent substitute for green food. It is also the best hay on which to winter young calves; with warm shelter spring finds them in good condition.

The great improvement in machinery within the last few years for cutting and saving hay has produced quite a revolution in this crop. Now a hundred acres of heavy grass does not look so formidable in

labor to a farmer as twenty did a few years since. With a good machine fifteen acres can be cut in a day; three men and four boys provided with long rakes and a stacker can save it, thus making forage faster than by any other process.

Timothy makes fine hay for work horses and mules. It grows well on low and damp lands, but does not succeed on the rich alluvial uplands. My experience has been that it will make more pounds of timothy hay per acre, to have it half clover than to have the timothy alone. I have not sown timothy alone for years, but mix with clover in equal quantities, whether designed for hay or for grazing. Sow the timothy in September and the clover the following spring. The advantages in this system are two-fold: you renovate the soil with the clover, and the timothy holds up the clover from lodging, making better hay.

In putting old and tired lands to grass, it will save farmers many disappointments to note one fact: it must not be shaded and choked out by other crops. Sow the timothy with wheat or rye in September and the clover the following spring, then, when the ground is dry in the spring, keep it grazed close. Or it can be sown in March with oats, keeping it grazed when dry. The sun and the air keep the young plants growing and in better condition to withstand the hot season.

A farmer having a good stand of grass should reflect long and seriously, and his necessities be great before ploughing it.

ESTILL, HOWARD COUNTY, November 1, 1880.

VARIETIES OF FRUIT TREES AND TREE PEDDLERS.

The committee appointed to report on varieties of fruit trees adapted to general culture in the State and marketing the same, including tree peddlers, would respectfully offer the following as the result of long experience and careful consideration. We have divided the fruits into two classes; those generally recognized as standard varieties for home use and market, and those which we consider personally as worthy of more general culture and recognition than now received:

APPLES.

Generally Considered Best.

Carolina Red June.
Early Harvest.
Red Astracan.
High Top Sweet (Sweet June.)
Maiden's Blush.
Lowell.
Rambo.
Pennsylvania Red Streak.
Jonathan.
Grimes Golden.
Ben Davis.
Huntsman's Favorite.
Winissgo.
Rawle's Janet.
Willow Twig.
Small Romanite.
Missouri Pippin.
Lawler.

Successful, but not as well known.

Early Red Margaret.
Letofsky.
Williams' Favorite.
Early Strawberry.
Sine Qua Non.
White Pippin.
Mother.
Born Beauty.
Stamford.
Clayton.
Lensinburgh.
Northern Spy.
Fall Queen or Bushinghan.
Newton Spitzenberg or New York Vandervere.

PEARS.

Most hardy and nearly blight-proof.

Tyson.
Seckel.
Lawnner.
Winter Nelis.
Buerre Rose.

On Quince as Dwarf.

Duchesse D'Angouleeme.
Louise Bonne de Jersey.
Beurre D'Anjou.
Tyson.
Beurre Giffard.

Productive and good but somewhat subject to blight.

Bartlett.
Doyenne Detee.
Clapp's Favorite.
Flemish Beauty.
Howell.
Beurre D'Anjou.
White Doyenne.
Onondaga.
Saint Germain.

CHERRIES.

For General Cultivation.

Early Richmond.
May Duke.
Belle de Choisy.
Gov. Wood.
Late Duke.
English Morello.
Carnation.

PEACHES.

Amsden.
Early Rivers.
Stees Early.
Troth's Early.
George the Fourth.
Foster.
Royal George.
Old Mixon Cling.
Old Mixon Free.
Crawford's Late,
Ward's Late.
Thathe Cling.
Smork Free.
Standley.

PLUMS.

Early Chickasaw.
Wild Goose.
Miner.
Imperial Gage.
Jefferson.
Lombard.
German Prune.
Damson.

APRICOTS.

Moorpark.
Large Early.
Early Golden.

QUINCES.

Orange.

GRAPES.

For table and market.

Telegraph.
Martha.
Wilder.
Concord.
Missouri Riessling.
Gœthe.
Elvira.
Rogers No. 2.

For Wine.

Norton's Virginia.
Cynthiana.
Gœthe.
Elvira.

STRAWBERRIES.

For family use and home markets.

Downer's Prolific.
Cumberland Triumph.
Charles Downing.
Capt. Jack.
Kentucky.
Windsor Chief.

For shipping.

Capt. Jack.
Kentucky.
Windsor Chief.
Minor's Prolific, Crescent Seedling and Sharpless promise well.

RASPBERRIES.

For family use and home markets.

Turner (red).
Hoosier Mammoth or Gregg.
Mammoth Cluster.

For shipping.

Thwack (red).
Gregg.

GOOSEBERRIES.

Houghton Seedling.
Downing.

CURRANTS.

Cep Dutch. | White Grape.

BLACKBERRIES.

Kettatinny. | Snyder.
Western Triumph.

HOW TO PROCURE TREES AND PLANTS.

The best advice we can give to the planting public and our farming friends, is that they plant an abundance of fruit of all kinds, and obtain them from a reliable source. Patronize your nearest nursery if you are convinced it is reliable—this is the best way. Consult with the nurseryman, if you think him competent and worthy of your confidence. He may often be able to select better than you could yourself, as he ought to be familiar with their quality. Tell him how many of each, summer, fall and winter varieties you want; be guided by his judgment, and then select smooth, healthy young trees, which have an abundance of fibrous roots. Do not send to a distance if you have a nursery near home. Your neighbor knows better what will suit your soil and climate than a nurseryman, however honest, who is hundreds or even thousands of miles away. If you have no nursery at home, deal only with *reliable* agents, sent out by reliable firms, who do not seek to delude you by extravagant stories, and show you impossible illustrations, but who can show their certificates of agency, and will charge you moderate prices for first class stock, which they are not afraid to guarantee true to name. It has now become so general a practice to sell through agents that it would be useless for your committee to try to counteract it; but we would warn you against the itinerant tree peddlers, and to place them and the whole subject before the people of the State plainly, we beg leave to refer to the following essay, read before the national convention of nurserymen at Chicago, which will show the relations of the nursery trade to the agents and the people in its proper light.

Perhaps there is no calling in any branch of industry followed throughout the limits of this vast country, on which rests a heavier responsibility, where so much depends on honesty, equability, knowledge and fair dealing, than upon the trade in and propagation of trees and plants and dealing in seeds. While in any other branch of business the purchaser buys what his taste and judgment requires him to buy, our customers buy only the germs, so to say, of their future orchards, lawns and gardens. They, in most instances, do not know what they are buying, and very often do not know whether what they wish to

buy is really desirable. They come to us or to our agents, depending largely upon our taste, judgment and experience to recommend to them what to purchase to make their homes more beautiful and attractive, their orchards and gardens more profitable. But very few of them know one variety of apple, pear or grape from another, by their peculiar growth. They must, therefore, take on trust what we sell them, and it would be just as easy to fill an order for ten varieties out of one row of surplus stock of one variety, for labels are very patient. It will be years before the purchaser will discover that he has been swindled, and the temptation is therefore great for unscrupulous men. A nurseryman, to be worthy of the name, must love his calling and feel proud of it, as one of the most useful and honorable; he must feel, when selling his stock, that he gives his customers more than their money's worth; that he throws in a piece of his experience into every bill for which he is not paid, and for which he should be entitled to the esteem and gratitude of generations to come. He must love his plants and trees and take a delight in their culture, which will stimulate him to work and learn incessantly, early and late. Were it not for this enthusiasm, which is such an essential part in the nature of every fruit-grower and nurseryman, how few indeed would follow it a lifetime. It takes, therefore, unceasing energy and industry, as well as a high order of intelligence and practical experience to be a nurseryman worthy of the name. What indeed would our country and homes be without such men, grown gray in their life-long efforts to advance horticulture and to educate the public taste to an appreciation of what is truly good and beautiful? But the nurseryman is mostly confined at home; his productions need constant care and attention. There is no vacation for him; his seed time and harvest come together, as planting and sales must be attended to at the same time in spring; when these are over, his growing stock demands his constant care and watchfulness; and it is but seldom he can have a breathing spell to compare his notes and experience with those of others. He must trust the sale of his productions to others to a large extent. He must send out agents to canvass, to visit the homes of our people and induce them to plant. We may safely say that three-fourths of the sales of the present trade are made by these canvassing agents, who make it their business to sell what we grow, and we may also say that three-fourths of the profits are made by them. They are a necessity, and were they only all of the right stamp would be a blessing to the community, for they induce thousands to plant what they absolutely need, yet would do without were they not urged by the agents to do so; but, unfortunately, there are two classes of them, and we will try and describe them as we have found them:

The reliable and trustworthy agent. This class, we are sorry to say, is in the minority, and therefore should be the more highly appreciated both by his employer and the public, whenever and wherever they meet him. He will confine himself to the facts, sell to his customers only what has been tried and found valuable, takes a just and honest pride in his profession and intends to give the people the full value of their money. He will, therefore, only deal with, and sell for, reliable firms, and keeps himself fully posted as to what is really valuable. He needs no undue persuasion or fictitious helps, such as impossible illustrations of worthless novelties, but he can speak plainly and to the point. While he can become really eloquent in praising what he knows to be worthy of his praise, he would scorn to mislead his customers into buying what he cannot conscientiously recommend. He makes staunch freinds wherever he goes, and can come back where he has once sold, assured of a hearty welcome. He is not afraid to show up all his dealings, and as he only deals with, and sells for, reliable men, can guarantee his stock true to name. Were it not for men like these, we would not have half the progress in horticulture among our farmers that we have. They are the best helps of the reliable nurseryman.

The itinerant tree peddler. These we may call the vultures, the scavengers of Horticulture. They "live and grow fat" on the gullibility, ignorance and credulity of the people. They go around and hunt up the surplus stock of nurseries, which they can buy for a mere song. They then take glaring pictures, pretending to represent some wonderful new fruit, a new Russian apple of marvelous beauty and productiveness, hardy as an oak and completely borer proof; extra sized pears grafted on blight proof roots, and guaranteed to bear the second year; Canadian peaches, growing upright and stately as a poplar, and producing peaches of marvelous size, flavor and beauty, which ripen in October and keep half the winter; grapes which are seedless and bear abundant crops without cultivation or care; rose trees which will bloom all summer, with all the variations of the rainbow, and hundreds of equally absurd representations. They sell these at fabulous prices, guaranteeing them to bear in a few years. They then take the surplus stock which they have bought for a mere nominal price, make twenty varieties of apples out of one, labeling them to suit themselves, and selling at a dollar what has cost them three to four cents. Their conscience is elastic enough for any emergency. We know of an instance in this town where an agent sold a hundred of wild Mahalele cherry stalks as a new French cherry of great value, at fifty cents apiece, and which, of course, are entirely worthless. Their only object is to get the money of the credulous, as they do not intend to come into the same neighbor-

hood again when the trees begin to bear. This is not an overdrawn picture; we could cite instances without number; old stubs of tulip trees, picked up in the corner of some nursery, sold as tree roses for $3.50 each, bush Alpine strawberries sold at $5 per dozen, and similar cases. There is no middle road between these two clases of dealers. The honest men will remain and belong to the first, while as soon as a man swerves from the strict path of integrity he will soon belong to the second. Deception is so very easy, and the temptation so great, that there is no halting midway. The unscrupulous tree peddler is one of the greatest scourges of humanity, a great deal more contemptible and dangerous than the common pick-pocket. He comes to the unwary under the garb of honesty, and imposes upon their confidence, taking hard-earned, honest pay for what he *knows* to be worthless trash. Those who buy from him have to wait years, believing all the time that they have bought something extra, spending their time and care on the trees and plants, and only when they finally bear, to meet with the most grievous disappointment. Can there be anything meaner and more criminal than such deception? And yet we meet these scamps every day with their oily tongues, brazen impudence, glaring plate books and their samples of monstrous fruits in glass jars which magnify, designating the trade which they pretend to represent, and doing nameless injury to it and the community, when their most fitting abode would be the penitentiary, if they get what they so richly deserve. We must all acknowledge the existence of the evil, and should do all we can to abolish and counteract it.

How can we do it? What are the best means to lessen it? We will name a few which we hope will greatly assist.

First—Diffusion of sound horticutural knowledge among the people. We need more information on subjects connected with horticulture, more education among the farmers. Nothing can be a more grievous error than the mistaken idea that every one too stupid for anything else can become a farmer; that the smallest moiety of education will do for the clodhopper, as he is contemptuously called; when, in reality, the farmer, to be worthy of the name, needs a more varied store of knowledge than the lawyer, the doctor or the merchant and mechanic. All of these avocations move in old, established ruts to a certain extent, their knowledge is more concentrated on certain branches and subjects, while the progressive and thinking farmer has the whole realm of nature as his field, he meets with something new at every step which claims his attention; nature is never at a standstill, but presents immeasurable phases to the thinking mind, and he must advance with the age or fall behind. He must be a close observer, a sound reasoner, be able to

trace effects to their causes, and to take advantage of all he sees, learning and improving constantly. We want, therefore, more information given the farmer's children on their peculiar calling; it should commence even in our common schools, and their attention be called there to the importance of the knowledge of at least the rudiments of botany of its relation to horticulture and floraculture; our teachers should be better informed and better paid, not simply take up teaching as a means of subsistence when they can find nothing better, and reduce all their instructions to the rudiments of spelling, arithmetic, writing and a few mechanical lessons in geography and American history. We want more and better endowed agricultural colleges where the student after he leaves the common school, can be fitted for the profession he enters, and made to see in its proper light, as one of the noblest and most honorable callings, the calling above all others upon which they all depend for support, but which also need a more thorough and varied knowledge than all the rest. We need more and better agricultural papers, to which all farmers and horticulturists should become contributors, but especially the nurserymen, so as to keep the people constantly posted on horticultural matters. We need a more thorough sifting of the profession itself. Now, every one who can whipgraft an apple tree, plant out his apple grafts and sell them when two or three years old, calls himself a nurseryman, while in reality the nurseryman proper should know how to propagate and train all kinds of stock fruit as well as ornamental, and be able to advise his customers in regard to every tree or shrub they may want to purchase, be able to tell them whether it is successfull or not. The nearer we come to such a community, the less they will be imposed upon. The public are much to blame themselves. Were they better informed and less credulous, such impostors could not exist, much less flourish.

Second—No nurseryman who values his reputation should employ men as agents unless he is convinced of their honesty and reliability, and to those whom he employs he should issue certificates stating that they are his agents. He should warn the people not to buy unless from those who can show these certificates.

Third—The people should buy only from those whom they know to be reliable, or show certificates from reliable firms.

Fourth—We should use all our influence on the publishers of illustrations of fruits, flowers and trees, and give them to understand that they cannot have our patronage and custom, unless they draw and color *from nature*, not miserable monstrosities as we too often see in their shops, and which are only calculated to mislead the people. We should discountenance and keep down all illustrations which are not

passably true to nature. These bogus illustrations are a great means to induce people to buy, and disappointment will be all the keener if the fruit or plant falls so far behind the mark. The plate books which agents use should be as near nature as possible, and the deception in plates is as reprehensible as the deception in language.

Hoping that the subject may receive the attention of the farmers and the nurserymen which its importance deserves, and may lead to a gradual reform in the trade, this report is respectfully submitted for your consideration.

GEO. HUSMANN,
Z. S. RAGAN, } Committee.

AN ESSAY ON MILLET—KINDS, CULTIVATION, VALUE, ETC.

By C. H. Weber, St. Louis.

Mr. J. P. McAfee, *Secretary Missouri State Board of Agriculture:*

Having been requested at the annual meeting of the Missouri State Board of Agriculture, held at Columbia, March, 1880, to furnish an essay on *Millet*, I have the honor herewith to lay before your Board the following remarks, which you will find meagre and not exhaustive, as I had hoped to make them, owing to the fact that the *Millet* family is extremely numerous and scattered over the four quarters of our globe, bearing different names in different countries. When introduced into this country ignorant dealers gave the plant any name they fancied; and thus a great confusion has arisen in the naming of the different species of *Millet* making it impossible for any one, not a learned botanist, to give the right name to the grass or grain he wishes to cultivate. As I cannot be supposed to be familiar with any other species of *Millet* than those coming under my own observation, I shall confine myself to the discussion of what is here known as *Hungarian Grass* and *Common* and *German Millet*. But as it will be interesting and useful to my readers to gain some knowledge of this useful plant, I subjoin some extracts from Chambers' Encyclopædia and our own Agricultural Reports. From these it will be seen that *Millet* belongs to a large family of plants, and is cultivated in almost all countries in both hemispheres, and is known by a variety of names. It is apparent, however, that certain species are cultivated entirely for their seeds or grain, whereas we in this country use it only as fodder or hay. I am unable to determine whether our so-called *German Millet* really is the *Setaria Germanica*—or our so-called *Common Millet* the *Panicum Miliaceum*, and whether our so-called *Hungarian Grass* is the *Polish Millet* (*Digitaria Sanguinalis*) or the *Millet Grass* (*Milium*

Effusum) mentioned below. I would most respectfully suggest to our learned Professor of Botany and Agriculture at our University to procure from reliable sources seeds of as many of the varieties of *Millet* as possible, and experiment with them at the Agricultural Farm, and enlighten the farmers not only of Missouri, but of the United States, as to the best variety to be planted by them, giving the right name to the plant, and also determine by practical experiments the value of *Millet* as a flour and bread producing grain. As appears from the subjoined extracts, whole nations live entirely on the grain of *Millet*, and others use it mixed with wheat and other flour, or as a substitute for rice. If this be so, we might, if we would not use it ourselves, export large quantities of the seed, which, especially in times of deficient wheat harvests, would no doubt bring remunerative returns to our farmers, as the yield in seed of our *German Millet* is astonishing, and the cultivation and harvesting of the same easy and convenient, the time of sowing extending in our latitude from May to July.

Some twenty odd years ago I procured a small quantity of *Hungarian* seed from Washington, and for years afterwards cultivated several acres of it, sowing it in May in well prepared ground, half a bushel per acre. Its growth was wonderful, frequently attaining a height of five feet or more, yielding from two to five tons of hay per acre which was relished by horses, mules and cattle. From some cause —either by deterioration of seed, or unfavorable condition of the atmosphere—it gradually dwindled in height and weight, and for some years it was almost neglected in my neighborhood. Then *Millet* or *Common Millet* made its appearance and proved more satisfactory than the *Hungarian*, until some planted its common relative, and it is now extensively cultivated, whereas six years ago the *German Millet* supplanted it and the other species have almost disappeared. Independent of its value as a fodder plant it prepared the ground finely for fall seeding, leaving it level, loose and free of weeds. I have frequently sown timothy on the stubble, merely harrowing it in, with good success. If intended for seed I would sow no more than one-half bushel per acre; but if for hay a bushel would be preferable, as in the first case the stalks become too thick and tough to be palatable to stock. A few years ago a friend in the East sent me a few seed of what he called *Egyptian Millet*, which I planted in my garden in rows, two feet apart each way, and two seeds in a hill. They came up like the small spears of grass, were hoed and kept free of weeds. They soon stooled out and spread and grew until they covered the whole ground. Some of the plants had thirty different stalks from one small seed, each stalk attaining a thickness of from

one-half to one inch, and a height of eight to ten feet. They formed an abundance of seed, which, however, never matured on account of early frosts. I sent a specimen plant to Prof. Tracy in Columbia.

This is about all I know, or can communicate, about *Millet.* If I have succeeded in awakening an interest in this hopeful plant, which shall stimulate my brother farmers to experiment, and impart the results to the State Board of Agriculture, I shall consider the time spent on the preparation of this essay, well spent.

CENTRAL, St. Louis county.

EXTRACTS.

[Chamber's Encyclopœdia.]

Common Millet (*Panicum Miliaceum*) is an annual grass, three to four feet high, a native of East India; also cultivated in the warmer portions of Europe for its seed, which, when mixed with wheat, make good bread and for feeding poultry. The straw is used for feeding cattle. Other species *Panicum miliare*, *P. frumentaceum*, *P. pilosum* are cultivated in India. *German Millet*, (*Setaria Germanica*), and *Italian Millet* (*S. Italica*) are considered varieties of the same species. *Italian Millet* is three to four feet high, *German Millet* much smaller and less valuable as a corn plant. (This makes me think that what we call *German Millet* may, in reality, be the *Italian C. H. W.*). The grains of both are very small, only half as long as that of the *Common Millet;* but they are extremely prolific, one root producing many stalks, and one spike of *Italian Millet* often yielding two ounces of grain. The produce is estimated at *five times that of wheat. Italian Millet* is called "*Koongoomie*," "*Kala-Kangnee*," and "*Kora Kang*" in India. To the same tribe of grasses belong a number of other genera. "*Penicillaria spicata*" is extensively cultivated in Africa and India, and has been introduced into the South of Europe. It succeeds best on light soils. It often receives the name of "*Egyptian Millet*" and "*Guinea Corn.*" Another species abounds in Central Africa, and is described by Barth as causing much inconvenience to travelers on account of its bristles, which pierce the clothes and the flesh. "*Digitaria sanguinalis*" is called "*Polish Millet,*" being raised in cottage gardens in Poland, where the grain is used as Rice. The "Millet Grass" (*Milium effusum*) of Britain, occasionally found in shady woods, is a very beautiful grass, three to four feet high, with a pale, spreading panicle of small flowers, and has been much recommended for cultivation as a forage grass, and for the sake of its abundant sma[ll]

seed. Another species of same genus "*M. nigricana*" is the "*Maize de Guinea*" of Peru, where its seeds, after being dried by heat, are converted into a very white flour, a pleasant article of food. The name of "*Indian M.*" is sometimes given to *Durra*, but it belongs to a different tribe of grasses from the true Millet.

[Agricultural Reports, 1860, Page 474.]

China.—It is on these northern plains that the Millet grows so abundantly. The "*Milium*," or "*Panicled Millet*," is one of the most elegant of the sereals, resembling oats in size and color, and prolific, too, for one stalk, taken at random, yielded 1,850 seeds. The "*Barladoes*," or "*Sorghum Millet*," presents a strong contrast to it, for the stiff culms of the grain rise to the height of fifteen or sixteen feet, and when the lower half has been stripped of its leaves for cattle, a field of them looks like a miniature forest. The taste of boiled Millet resembles that of fresh hominy. The stalks of the *Barladoes Millet* are extensively used in Northern China, as they are in Egypt in the construction of poor dwellings, also for strengthening dikes, and construction of fences, also for fuel.

[Agricultural Reports, 1854, Page 160.]

"Indian Millet" (*Holens Sorghum*) is a native of India, and is cultivated in most parts of Asia Minor, Africa, the West Indies and Brazil. It has also been introduced into the South of Europe, China, Cochin China, Japan and into the south and north portions of the United States. In Arabia it is called "*Dora*" or "*Dourah*," in France, "*Sorgho blanc*," or "*Doura*;" in the British West Indies, "*Guinea Corn*;" in the United States, "*Dourah Corn*" and "*Tennessee Rice.*" It will grow to perfection from Pennsylvania to Texas, and doubtless would mature its seed in most of the Western States south of Iowa. First grown in Georgia in 1838. There are two varieties, "White" and "Reddish Brown." The brown is preferred, as it is more prolific in grains which matures earlier, and yields four times as much.

CULTIVATION.—Grows well on the poorest soils. Planted in March, April and May, and sometimes in June and July in drills or broadcast. Will yield from ten to one hundred (?) bushels of seed to the acre. It is sometimes cut green for soiling cattle and mules. Also cured and made into hay or fodder.

USES.—Besides serving as food for fowls and animals in Egypt, India and China, it is used as food by the inhabitants.

A failure of this crop in Arabia would be as great a calamity almost as that of the wheat crop. It is their food and fuel, and grows by scanty irrigation on land which produces scarcely any other grain. It is ground into flour and cooked alone into cakes and bread, or mixed with rice, flour and other food. In Germany it is substituted for rice, and sells for about the same price. Taking into consideration the fact that it will yield more stalks, fodder and grain on a greater variety of soils, and with less labor, in any season, and return more litter to the land than any other grain, and being universal food for man or beast in tropical climates, it may justly be considered one of the most valuable of the cereals.

[The very thing for our neighbors in Southern Kansas, as it can be sown after the grasshoppers have left, and furnish bread for man and hay for animals.] C. H. W.

[Agricultural Report, 1872, Page 495.]

Mr. J. F. Lawrence, in an address to the Board, urges the raising of Millet as a forage plant. He regards it as preferable to fodder-corn for winter feeding. It can be raised on ground too poor for corn; the expense of its cultivation is not as great; it is as easily cured as English hay, and is much more valuable as a forage plant.

VERBAL ADDRESS OF PROFESSOR MEEHAN,

OF PHILADELPHIA.

LADIES AND GENTLEMEN: Some few weeks ago, or rather some months ago, I had the privilege of attending the meetings of a very learned society, in which very learned treatises and very learned languages were introduced. It seemed almost that Demosthenes and Cicero had returned to earth and were talking to us in the language that they had been accustomed to. And the society became very popular. The meetings were attended by the first families of the district, and they became quite fashionable among society people, who pronounced the addresses very interesting, though they did not understand a word. Now, I have come to address you on matters of science, but, I trust, it will be not only interesting in a fashionable sense but instructive as well. Science is very much aided by a knowledge of learned languages and by a knowledge that is gained only by hard study; but it is not absolutely necessary for one to be very learned in order to be scientific. There are materials around us which will make just as scientific characters as if we were familiar with all languages. To illustrate, let me mention a circumstance. A friend, who was very much interested in science, proposed to me, after a scientific meeting, to take a trip into the country, to visit a farmer friend of his. In going over the ground of his friend, my friend was in the habit of snatching at everything, first of this weed and then of another, he would say, "this is an aster or golden rod;" of a rock, "this is a piece of limestone," and our farmer friend seemed very much interested in the learned character of his scientific friend. Presently the scientist remarked, "this is a sheep's bone;" of another, "this is a hog's bone;" again, "this is an ox bone." (Laughter.)

The poor farmer was amazed, and timidly remarked, "Science, I know, is a very learned thing, but I would like to know how to distinguish one bone from another. How far are you able to tell, for instance, a sheep's bone from a hog's bone? Why is this an ox bone?"

"Do you not see," remarked my scientific friend, "that this is proved because you can see where the butcher sawed the steak off it." (Laughter.) Now, such an observation as this, is a scientific observation.

There is science in being able to distinguish an ox bone from a sheep's bone, even through a butcher's saw, and this goes to show that science is very simple; it is indeed but accumulated knowledge. It is important to understand that science is not a very learned thing. It is simply, as I have said, in correct observations from known truths. I have promised to speak to you of practical lessons from science; and, perhaps, it would be as well to show how little facts in some sciences may aid in deciding greater facts in other sciences.

The speaker then took a rapid view of some theories in connection with the history of the earth, how it was once a molten mass, a mere red hot ball, how with the surface gradually cooling the waters came, and how from the uniformity of temperature there could be no winds, because, illustrating his remarks by the heating of a tea kettle, it required two extremes of temperature to make a current. Proceeding, then, to show gradual cooling, he traced the origin of life, first, in the waters, then in amphibians on the land, then as higher organized plants, the earth even to the poles being still warm enough to bear palms and other tropical plants; cooling gradually till ice formed there, how the increasing mass of ice brought on atmospheric currents, resulting in the gulf stream and many other well known natural movements, and showed how all these stupendous masses of knowledge could be worked out by studying a few fossils in the rocks, the rising of a stick from the bottom to the top of a pail of water, or the putting together of other little facts which any one could gather from material about him.

Again, as showing how a trifling fact may influence a great question, he said, in California some years ago, a skull was found in a series of rocks, where no human remains had ever been known before. It became a question to those who are forced to take the human race as its history, I have already given, how the skull ever found its way there. Those who were familiar with the recognized history of the world, felt satisfied that the skull could never have occurred there in any natural way, but by some artificial means. But the scientist who found it was a reliable man, and intelligent people were very much interested about it. But a small shell was found in it, a modern shell, not an ancient fossil shell, and this, of course, showed that it was a modern skull.

Before this I had not a high esimate of conchology. People collect shells very often for mere amusement. No result seemed to follow from merely collecting shells; a collection of shells seemed interesting to look at, but no practical result could follow from studying them. But by this result from the shell in the skull, the conchologist settled a question of intense interest, and this little incident shows how one little fact, even one which we think of no consequence, will help us to demonstrate and settle great discussions. And this is one of the points which I wish to call your particular attention to; that there is no fact, no matter how apparently insignificant, even to the manner in which the butcher saws a steak, but what is worth learning and may some time be found of importance.

But my object to-day is to confine myself to botanical science, because it is one with which you young people, gathered, as I am told, chiefly from the farms of the State, are more familiar and will be of more use to you when you leave these walls. Botany, at the present time, is not what it used to be. It consisted about one hundred years ago of little more than collecting plants and naming them. So far as plants had an influence in the mere physical wants of man, they were thought useful. It was, however, some sort of a science to those of that day, and they proceeded to collect plants together and arrange them in some system. There was some pleasure, but very little value, in these attempts. Even up to the time of Linnæus botany consisted of but very little more than a mere arrangement and naming, according to the leaves; but arrangement constituted at that time botany. Linnæus did but little more than systematize botany. He finally invented a system of botany, and by the fortunate circumstance of arranging his terms after social analogies, he threw a sort of romance into his work. The plant was likened to a family, husband and wife, etc. This romantic association gave botany attractions, and made it extremely more popular than it otherwise would have been. And thus people were led to study it. But it was found to be of no great value or importance, and was soon abandoned; but at the same time it was the means of drawing to its consideration a great many persons, and probably caused the great enthusiasm for botany which it has since acquired. At that time it was little more than a skeleton.

It was like the story of the Persian, who had the power of making a human being. He is said to have made one entirely perfect, but he was unable to give life. Now, it seems to me, that botany was in the days of Silby just as this body was to him who made it. But modern botanists have made of this Linnæn skeleton a living thing. I may give a few illustrations of how this living science aids other sciences.

For instance, we know pretty well by geology that all the northeastern portion of this country to the Potomac was covered by ice; it is also known that this body of ice receded very rapidly. How that was done no one knows. The icy mass came south slowly but receded rapidly. Homer suggests there was a time when there was a large tract of land in what is now the Atlantic Ocean, that evidently sank. Almost all moderns have considered the story fabulous, as they did even the existence of the city of Troy, now known to be true.

But we now know that the immense fields of ice existing in the glacial period could not have been if the warm gulf stream passed as near to it as now. A large tract of land near our coast in the Atlantic would cause the stream now flowing northwardly to take a more eastwardly course. If that land suddenly sank the warm stream would suddenly hug our shores, and suddenly cause a rapid retreat of the great glacier. Just here botany comes in with its contribution to the question. There is a slight relationship between some of the plants of the west coast of Africa and the eastern coast of America, pointing to an ancient connection, now lost. A sinking of a continent would be just such a lost link. But a more interesting fact of this botanical character is thrown into the origin of the Indian. He seemed to have Asiatic relationships. If there had ever been a land communication with Asia it would aid in settling the question. Now the plants of the Eastern or Atlantic States are in many cases identical or nearly identical with those of Asia. This could scarcely be unless they traveled from one original center by land. There can be but little doubt but some part of what is now the Pacific Ocean was once land that has since sunk to the bottom, making for long lost ages a separation between its ancient human connections, as well as its botanical relationships. And further, we know from geology, or rather paleontology, that species of plants disappear in proportion to the age of the earth. As the relationship between the existing flora of the Eastern or Atlantic States and Western Asia is closer than that between the former and Africa, it would show that the land sinking in the Atlantic took place many ages anterior to a similar phenomenon in the Pacific.

These are all illustrations of how botany helps intellectual studies. But another interesting matter botany may settle, for instance, the origin of coal. We all know what coal is, but as our coal exists in veins through the earth, sometimes six inches and again some will be many feet and even sixty feet thick, and it is generally supposed that all this coal is formed in some way by vegetable matter, but just how has never been entirely settled, because there are some facts which tend to one conclusion and some to another. For instance, if masses of earth

were suddenly thrown on to the vegetable matter we would seldom find that matter, when compressed, 60 feet thick, for the living forest would be little more in height, then it would not be all of an exact thickness in the same veins as now. These facts struck Prof. Huxley, and one day he noticed a burning piece, and that it gave out the same flame as that of lycopodium powder, and had other characters of flame formed from pollen. But pollen is so small that millions on millions of grains would be necessary to a square inch. But he found the pollen of a conifer of the coal period had grains of an enormous size. In brief, he concluded that the coal measures of England resulted in a large degree from the pollen of the ancient forests. This conclusion is not shared in by other men of science, but it shows how, to a great mind, stupendous conclusions may be reached even by so small a fact as the burning of a little piece of moss. Thus we see how very great questions may be settled by botanical science.

But I am reminded that I must talk to you of practical lessons. What I have said so far is to show the intellectual value; and such intelligent questions will always have an interest to an intelligent mind. At the same time it is the object of science to aid in every walk of life, and I will now call your attention to some few practical facts, which may be of value to you on your return to your rural homes; you have noticed that Osage orange hedges, when made into a fence and cut year after year, the stem does not get any larger than ones wrist, but if left to grow for ten or twenty years it would have a large trunk, and it is decided that a tree does not increase in girth if trimmed. Botanical science tells us why trees feed through the leaves and draw in air; in other words, they breathe, and actually feed on atmospheric substances; this has been proven in many ways. A great deal of interest has been created in the so-called carnivorous plant. The so-called botany of Linnæus' time was very interesting but it bears no comparison with this subject of plant life. Darwin has proven that plants absorb from the atmospheric matters besides mere carbon. For instance, there is a plant growing on the shores of North and South Carolina which is in fact, as well as name, a real fly-trap. When the fly lights in the centre of the leaf it closes down on it and keeps it there till it is absorbed or eaten. It was once believed that the leaves did not eat them, but a series of careful experiments by Darwin show that the plant did actually absorb them. In order to test the matter more thoroughly pieces of beefsteak were used; a piece of beef wes placed upon leaves of this plant and another on an adjoining but different species of plant; on the former plant it was found, upon examination, that the beef would disappear in half the time

it would on the other, and investigations from this fact led to others proving that all plants absorb matter through their leaves from the atmosphere. Now we bring this fact to bear upon the question of pruning as regards trees over mere bushes of the same species, there are thousands and millions more of mouths in the shape of leaves, and they enable the trunk to grow larger because of this increase of food but when trimmed it cannot eat as much. It has not the opportunity to get as much food as the large one, that is why trunks of trees do not grow when trimmed. Then we find their vital power is checked by pruning. For instance, we cut down a large tree, it sprouts from the bottom ten or fifteen feet long in one year, and we imagine that it was good for the tree. But science comes in and teaches us that the plant and tree also absorb for the future, and not only for the present. A large amount of food is stored away in tree trunks for the next year's use. Pruning is a weakening of the vital power, notwithstanding this strong growth. This is shown by trees along streets when they have their tops cut off. It so weakens the vital powers of the tree that they are all short lived; the reason they take a strong growth after pruning is because they are merely feeding on stored food. Half a dozen branches are feeding on food intended for a hundred. This is very well illustrated by trunks of trees separated from the ground; they will remain as logs and the next year you may see sprouts come out from them, although no part of the tree is connected with the ground. This is not proof of the strengthening of the tree but it is proof that matter has been stored away in the trunk. There is no end of proof that pruning injures trees rather than strengthens them. This little fact will come into great use. We will see at once that although pruning is necessary it is at the expense of vital power. Of course there are cases in the practical operations of tree growth when pruning will be necessary and of great advantage. Sometimes we must violate one law in view of the demand of another. Take a practical illustration in the shape of grape growing almost every one knows from experience that the tendrils should be pruned off. Now there have been some very interesting facts brought out of late years, enabling us to apply this principle. Mr. Darwin has found that these tendrils make a circuit every few hours, unless they find something to cling to, when they will cease their circuit. The horse which is to run a long journey must be fed well before, or he will not stand it. Continuous motion requires continuous food. It is evident therefore, that this continuous circuit required a great deal of food, and that food is wasted if the tendril found nothing to cling to. This useless motion, draining nutrition, would be saved by cutting off the tendril. It would save nutrition. We see a grape vine on a tree run twenty

feet, while one on a stake will not grow one-quarter of that distance in the same time. We find that the tendrils cling to trees and save that motion, and we have the same result as if the tendrils were cut off.

Another very interesting lesson might be introduced in the matter of grafting. There are white grapes and black grapes; we may have a black grape growing and we may graft a white one on it, then a black one, then a white one, and so on continuously and have a chain of different kinds forming a single stem, but each grafted link will produce its own kind, the same roots and leaves feed all through both, keep their white and black character. Thus after ten years or any number of years, each branch will produce its species. That seems very strange. One would suppose that the kind would be changed, having but one set of roots. That brings us to the study of how wood is formed and how form itself originates. We find that the little cells of which stems are formed are the individuals, and though together each cell has its own inherent power, the principle of one cell is imperiled by the new cell which is formed from it. This brings us to the question of how wood is formed. We see circles of wood in a stick and every one knows that one of these is the result of one year. A little cell bursts and a new one comes from it, and these cells finally unite together and form the mass of wood. By understanding this we see how it is that the wood is sometimes thicker in different part, of the same growth. Some of the cells have little material to make cells. For some reason they were imperfectly nourished; the cells are therefore fewer; in consequence of the cutting off of the supply of food the trees become irregular. Cedar trees are no tperfectly round, and this is because the cells in some part of the annual ring of wood have more nutrition than in others. And thus you know when this little principle of cell individuality is understood why we can ascertain how old a tree is. I might, if time permitted, give many other illustrations as to how botany aids us in regard to the life and construction of cells. Even as regards the mere classification of plants I might bring many illustrations showing how botany may be made to subserve practical affairs. But I will confine myself to one more simple illustration of botanical service. It relates to planting trees, in which most of you know there is a great deal called luck as well as science. It is the *science* in transplanting that I refer to. When trees are transplanted they will sometimes live and sometimes die. I heard one of your friends say this morning his trees were planted with care and yet died, while his neighbor, who planted carelessly, had better luck. But there are scientific laws that tell us why this is, and when we know these laws it enables us to throw luck aside. The tree requires moisture, and unless it gets a certain amount

of it the various vital processes cannot go on. The moisture must be circulating in a rapid stream, so that it may regain the points evaporation has lost. You may get an idea of this immense amount of moisture by understanding that the wild cucumber vine which makes branches enough to reach a half mile, and has thousands of leaves all wasting water, have to get all the water they need through a stem not a quarter of an inch thick at the ground. It is said thousands of pounds of moisture pass in twenty-four hours through this little stem. When you get an idea how much thousands of pounds are, you will see how fast it must necessarily go through the stem. Now when we transplant trees we cut off a portion of the roots, and the tree cannot draw in as much moisture as before, and which is necessary to carry on these vital processes, and it becomes necessary to guard against its clamors for so much drink. If there are less roots it becomes necessary to prune off some of the branches and leaves so as to lessen the demand on the roots.

We see here the application of our former illustration of varying laws in plant life. While pruning is in some cases a detriment, in order to check the evaporation of some of the branches it is useful, and it is just as necessary in the winter as it is in the summer, for although not to the same extent roots are growing all the winter through to supply evaporation which is at all times going on. Trees, though without leaves, are still giving out moisture all winter. No matter how cold it is there is enough internal heat to keep the tree from dying, and the little fibers still draw moisture to supply this waste and keep the cells warm. Though the ground froze in the fall, the roots will keep growing a little, and thaw their way through the frozen ground.

These facts show that there is an internal heat in vegetation which enables it to grow. Similar facts have been observed in the arctic regions on the borders of the icy chains. Little gentians will even grow and produce seed in the self-thawed caverns in blocks of ice. This process of heat and evaporation goes on in all trees during winter season, and should show, therefore, the value of pruning in transplanting in order to check the demand for moisture which the mutilated roots cannot give. Another thing comes to aid us here. As it is necessary in transplanting trees to give them every aid possible to draw moisture, it is necessary to pack the earth around the roots so that they may be solidly transplanted. I overheard a farmer say this morning, "I like to plant trees just before a rain comes, so as to settle the earth about the roots," that shows that if the earth is not packed properly the rain could do no more. The planter should see that there are no spaces left and every advantage be given by actual contact with soil, that every

portion of a root should work in order that the tree may live. By understanding this law of heat and moisture in botanical science we gain excellent practical reasons in transplanting as well as in other things. I will not go on with similar illustrations. They are not necessary. My point has been to show you that science is not a dry study—a mere knowledge of Latin and Greek. Great learning is useful but not necessary in the study of botany. I have tried to show that there is in every-day operations something which will engage a scientific mind very pleasantly, and it has been my object to induce you to believe this particular science, applied practically, would be of singular advantage to you in future courses; and I trust as you go through life that you will think nothing too small nor too obscure to be worth investigation. In the application of little things you will often find great profit. Especially you will find in botanical science as much profit and pleasure as you will in any other branch of intellectual life.

SORGHUM MILL IN CONNECTION WITH THE AGRICULTURAL COLLEGE—THE PROPRIETY OF THE SAME BEING ESTABLISHED BY THE STATE.

REPORT OF I. A. HEDGES.

HON. JOHN WALKER, *President of the Missouri State Board of Agriculture:*

The undersigned committee appointed by your honorable body at their late meeting to consider the subject of establishing a sugar works upon the College Farm under the supervision of the Faculty, would beg leave to submit the following report:

Since the data of our appointment, we have had a season of culture and manufacture of sorghum (*Holcus saccharatus*), the results of which are as yet not fully known, although enough is reported to give increased confidence in the paying results of this industry, were it fully understood. By a personal observation and inspection of many works by the chairman of your committee during their working, we are assured of the final triumphant success of this crop in our State, as one only needing the active and fostering care of your honorable Board, with such assistance as the best interests of the State shall admonish the Legislature are justly due you. Although the great persevering character of our people would ultimately work out the problem, nevertheless the pressing needs of the whole country for a more speedy solution, call for the adoption of the plan set forth in your late proceedings, which have called forth the labors of your committee. We will beg leave to say that as yet we have delayed making any definite plan, from the fact that we desired all the knowledge that could be derived from the operations of this season's crop, which are not yet quite concluded. To this end a member of your committee has made an extended tour for the purpose of examining the various works and their results, samples of which are placed before you. The demand for the sugar and syrups in the immediate vicinity of these factories, will absorb all they produce, with the exception of two, viz.: One at Anthony, Harper county, and the other at Larned, Kansas; and their surplus is finding a ready sale at paying rates at Denver and other mountain markets. The price at the several works is generally fifty cents per gallon, and nowhere less than forty cents, exclusive of casks.

At these prices the entire product will not last thirty days after the close of the works. We are pleased to report that from the improved quality, as shown by these samples and the clamor of the people for it, that the price will advance until capitalists will be induced to invest in its production, instead of laying out large sums in glucose works, for the production of an inferior compound that is being pressed upon the market, and sold under the disguise of fancy names and deceptive appearances while its true saccharine is only two-fifths of cane syrup. But the people are becoming sick of it, as is evidenced by the increased demand for the pure syrups of our own farmers. Gentlemen, your committee believe you have taken a step in the right direction. Ask our Legislature, soon to convene, to make an appropriation, commensurate with the importance of this subject, and empower your Board to contract for suitable works to be located near the Agricultural College, where the students may be employed and educated in the art of sugar and syrup making. If there have been any instances of failures this season in realizing satisfactory results, they will be found to have resulted from one of three causes, viz.: Want of skill in the operators, unfortunate season, or a failure to be prepared in season with works sufficiently effective to take off the crop in season. It is to the former drawback that we will call your attention, as being directly within your province. With such aid as before indicated to remedy, and with it where needed, will cease the latter difficulty. Such works as we deem best suited for the object set forth, will call for the employment of steam power for the propulsion of the mill as well as steam in the process of manufacturing the syrup and sugar. We would favor the use of fire evaporation to a sufficient extent to teach that process, in view of the fact that there will of necessity always be a large number in the country who must continue that method of working. The expense of a suitable engine and boilers can be made easier by employing them after cane season is past for other uses. Our State is one of the best stock raising States in the Union, and our Agricultural College may do very much to develop that department; and in the feeding season, steam power can be employed in the preparation of food in the best possible manner for the various stock upon the farm. The cane sheds can be so arranged as to be readily converted into stalls, and the mill room and other apartments can be employed as store rooms, while the tanks can be made to serve well as meal chests, etc., thus utilizing the works for the two industries, for which our State seems by nature peculiarly well adapted. The works

may be made a source of revenue, if all the advantages are embraced that the cane crop will afford—independent of the greater benefits to be derived by the State at large from the skilled men that will go abroad from this school to apply their knowledge at home among the people. The fact of the bagasse furnishing the fuel for the works has been fully demonstrated in the presence of one of your committee, which adds much to the profits of the business and assures the complete success of this industry in the near future. Your committee would recommend a works of a capacity to work up a crop of one hundred acres in the space of thirty days, but would not favor the production of more than ten of it on the college farm by the students, lest it should interfere with the labors required at the factory and other farm work. The residue of the crop may be made by surrounding farmers and delivered at the works upon satisfactory terms.

AGRICULTURE OF THE ISRAELITES.

AN ADDRESS DELIVERED BEFORE THE MISSOURI STATE BOARD OF AGRICULTURE, STUDENTS OF THE UNIVERSITY, AND CITIZENS, IN THE CHAPEL, ON FRIDAY, NOV. 12, 1880, BY JAMES S. BLACKWELL, PROFESSOR OF HEBREW AND OF SEMITIC LITERATURE IN THE UNIVERSITY OF MISSOURI.

It has been announced that I am to deliver an address on "Oriental Agriculture," before the Board of the Agricultural College, and the agricultural department. If properly defined the term *Oriental* would include all the far East; and I should be expected to treat of the agriculture of the Hindoos, Persians, Babylonians, Medes, Assyrians, Arabians and Israelites. Among scholars, the term Oriental Languages now, if not before, includes the Sanskrit, the Zend, the Persian and many other tongues not Semitic in origin or affiliation. If I were to treat of Oriental Agriculture in this broad sense of the word, I should not be able more than to indicate the outlines of the subject, without being permitted to particularize in any manner. I shall therefore beg to be allowed to confine your attention to the subject of agriculture as developed among the Israelites, detailed by direction or indirection in the Bible, by contemporary heathen writers, by the monuments and paintings of Egypt, by what is known of the surface, climate, water and soils of the Land of Canaan, collated and arranged by Robinson, Jahn, Smith, Wilkinson and others, and largely treated of in the Talmud, as many of the innumerable Rabbis whose labors are represented in that vast compilation of religion, wisdom, nonsense and obscenity, were personally familiar in Palestine with the peasant life, feelings and traditions of successive generations.

Agriculture was, it is said, not the chief occupation of the primitive man, if, indeed, he pursued it at all. The bone and stone deposits of archæologists, as well as what we certainly know of our own country's savages, make it highly probable, say they, that the early man, if a savage, preferred to support life by the perils, the hardships, the allurements and the excitements of hunting and fishing. If the first men were savages, (according to the philosophy of Tylor, Lubbock and others) we should hardly find the faintest rudiments of agricultural knowledge among them; doubtless universal men would still be savage, as it is

altogether contrary to experience for a savage people unaided to raise itself above the level of savagery. A knowledge of agriculture presupposes and is concomitant with a certain development of civilization, of peace, order and social law.

The Bible story represents Cain, the first born of woman, as a tiller of the soil. Abel represents a lower degree of civilization; since the shepherd must ever be a nomad, incapable of forming, fixing and establishing stable institutions. The first contest between this higher and lower civilization took place in that early stage of the world, in the representative persons of Cain and Abel, and the higher civilization prevailed. It matters not what may have been the subject of dispute, whether, as the Midrash gives it, it arose from Abel's trespassing on Cain's division of property; or whether, as it is stated in the apocryphal Book of Jasher, the flock of Abel ran over Cain's plowed ground; or whether the contest arose from Cain's denying the immortality of the soul and a future judgment, as it is given in the Jerusalem Targum; or whether it was, as Rabbi Menahem says, a word should be spelled z-i-z-i-t or z-i-z-i-s; it matters not whether Abel was killed with a sword, as St. Chrysostom says; with a spade, according to Prudentius; with an axe, according to Irenaeus; with a club, according to the artists; with a stone, according to Abulensis and the traditions of the Mussulmans; or with the coulter of a plow, according to the Book of Jasher; the contest was one which was typical of the superior strength, skill, or cunning of the agriculturist.

After Noah descended from the ark, one of his first acts, as recorded, was the planting of a vineyard, among other employments of husbandry, thus giving a degenerate example after the flood of an art which Cain had dignified in its higher grades, if it be true, as the Targum of Jerusalem says, that his first offering to God was of flax. It is probable, however, that the earliest cultivated branch of agriculture was gardening. The early man would be driven to procure the elements of domestic sustenance before he could undertake the cultivation of farms which supposes a settled order of government, some extent of population, the establishment of emporiums of trade, means of transportation and common principles of barter or sale. Vegetable gardens, or "gardens of herbs," are mentioned in the Pentateuch.

But the Hebrew word *gan*, usually translated *garden*, is somewhat different in meaning from our common acceptation of the term, and approaches in signification the Persian word *Paradise*, which seems to have been introduced by Solomon into Hebrew poetry, and afterward to have attained a multitude of meanings in all the Semitic languages. The garden was generally an inclosure hedged in with thorn or stone-

walls, with the watch-tower, yet common in the east. On the outskirts of the city beyond the walls was the common situation of the garden, which was planted with choice trees and shrubs, the palm, the fig, the pomegranate, the olive, the walnut, aromatic balsams, and the sycamore. There was one, although, according to the Mishna, in Jerusalem called the Rose-Garden, which lay west of Mount Moriah. Exotics were cultivated, the Israelites having brought from Egypt the national taste for flowers.

In Egypt every guest on entering a house received a bouquet of flowers. The guest at parties was presented with a lotus, and had a chaplet around his head and one around his neck. Flowers crowned the wine-cup and the cup bearer. Even artificial flowers were known. The Israelites could violate the usual regulation as to the location of the garden in favor of the rose of Sharon.

The situation of the garden was determined by the proximity of water, or the practicability of its transportation, or the ease of forming cisterns in natural basins. Most of the water in Palestinian towns was kept is cisterns. The soil of the garden was cut into channels if the garden, as it often did, lay at the foot, or on the slope of a hill and the water of the hill rivulets was caught in shallow basins with borders of raised earth. Doubtless the water was borne from these pans or reservoirs in buckets suspended one at each end of a wooden yoke, held on the shoulders, as was the practice in Egypt. In Deut. 11:10, Moses alludes to the method of irrigation used by the Israelites in Egypt:

"For the land whither thou goest in to possess it, is not as the land of Egypt, from whence ye came out, where thou sowedst thy seed, and wateredst it with thy foot, as a garden of herbs."

This foot-machine for raising the water is mentioned by Philo. The country-houses of the kings were surrounded by gardens, which were used for festivities. On account of their remoteness and seclusion, they were resorted to by the pious for purposes of devotion, and it was in the Garden of Gethsemane that the first awful act in the tragedy of man's redemption was wrought out. Burials occasionally took place in gardens, as in the case of the infamous king Manasseh, who was deemed unworthy of the sepulchre of his fathers among the sons of David. In the loose and irreligious times of Jereboam, "who made Israel to sin," it gradually became customary to set up idols in these cool retreats. It was in the farther East where the oriental idea of gardening was carried out on a scale of sumptuous magnificence.

I have no time, and it is beside my purpose to describe the terraced gardens of Bobylon, which were erected in the flat plains of the South by Nebuchadnezzar to gratify his mountain-loving Median queen, but

I have no doubt that these immense pyramids of green and floral glory flushing with the thousand tints of a sultry sun, and fragrant with the spicery and sweets of a thousand mingled perfumes, lent dignity and grace to the popular longing for cool, delicious shades, balmy breezes, fanning the tufted palm, and soothing the languid and feverish breasts of the dusky sons of the desert. This notion of paradise, sensuous and captivating, was but rarely used by the early Christians, excepting in the Apocalypse of John. Christ, conspicuous for his use of the language of popular apprehension, condescended to employ it on the cross to aid the feeble faith by appealing to the fervid fancy of the thief, when time was pressing, explanations impossible, and the object to be attained imperative. Not so, however, with Mohammed.

The prophet promised to the faithful a paradise of endless extent, crystal rivers, mansions of the most precious stones, a repose in the shades of a tree that overarched this boundless land, from the branches of which the faithful could pluck any fruit that was pleasing to his fancy, and anything that he desired, even rich and gorgeous apparel, such as the bird gave to Cinderella, and at the wish of the faithful, magnificent steeds splendidly caparisoned, and eighty beautiful houris with soft and languishing eyes would be present awaiting his behest. The private gardens of the wealthy Israelites doubtless, as in Egypt, contained fish-ponds and game preserves as well as poultry yards for hens and geese, stalls for cattle, wild goats, gazelles and other desert animals. I know it has been said that the cock and the hen were unknown to the Israelites. They are not mentioned in the Old Testament, and do not occur on the monuments of Egypt. But such negative evidence is worth little. The camel nowhere occurs on the monuments, and yet no animal was better known. Some of the best scholars think that domestic poultry came into Judea with the Romans. This is also the opinion of Dr. Houghton in Smith's Bible Dictionary. For myself, I do not believe it, and I think it possible that some things may have escaped the learned Biblicist. In 1 K. 4:23, it is said that certain fowls were fattened for the table of Solomon. The Hebrew word *barburim*, there translated fowls, is understood by Kimchi to mean not only cocks but *capons*. I am aware that the Targum of Jerusalem glosses it by the word geese, which Gesenius agrees with. I know that the Talmud says that it was unlawful to keep poultry because they might defile a passing offering, but in the treatise *Erubhin* is mentioned a long discussion as to whether an egg laid by a hen on the Sabbath-day could be eaten on that day, and the cock is so well known as to be called by four different names, and as to give a title, *k'riyath tarn'gala*, "cock-crowing," to one of the divisions of the day. In the treatise,

Berachoth, of the Talmud, is an instance given of the stoning of a cock by the people of Jerusalem, because it had pecked a child in the *fontanelle* and killed it. If the animal was unclean, the prohibition against it was, therefore, disregarded, and it was found in the yard of Caiaphas, the high priest himself, on the night of Peter's betrayal of Christ. If it be said that Caiaphas was a Sadducee and did not regard the traditions, it may help my argument sufficiently to give a presumption of the presence of this fowl in Jerusalem from the time of Simon the Just, or the third century before Christ; besides the immense commerce of the Phenicians with the whole world, makes it extremely probable that the animal which recalled to Peter the words of his Lord, had been introduced into Palestine in Solomon's time. The garden was the special station of the bee-hive, whose product was so great that honey in Ezekiel's time was a common article of export. The presence of floral vegetation in the garden facilitated apiculture. Canaan was emphatically denominated as a "land flowing with milk and honey." The fables of the Rabbis exaggerate as usual the productiveness of the land. Rabbi Jacob said that he once started on a three mile journey and early in the morning got mired ankle-deep in the honey which dripped from the figs. The Resch Lakish said that he saw with his own eyes near Zippori a stream of milk and honey sixteen miles long. The language of Moses is hyperbolical, but perfectly legitimate. Honey was consumed in immense quantities by the people, instead of our sugar, which was unknown to the Israelites, Greeks and Romans. Solomon refers to the eating of honey as a picture of happiness.

"My son, eat thou honey, because it is good; and the honeycomb, sweet to thy taste; so shall the knowledge of wisdom be to thy soul." —Prov. 24: 13, 14.

The rapidity of the formation of honey by the bees of that country which is distinct from our honey-bee (*Apis mellifica*) is shown in the case of the honey of the carcass of the lion which Samson slew in his return to Timnath. The wild bees were collected into swarms by a tinkling sound. The sting of the Palestine bee was dangerous in that warm country, leading Isaiah to refer to the terrible Assyrian as a bee. The honey upon which John the Baptist fed was not made by bees. It is called in the N. T. *meli agrion*, "wild honey," and is referred to in the Book of Samuel, 14: 25, (*Yarath Hadd'bhash*) in these words:

"And all they of the land came to a wood, and there was honey upon the ground! And when the people were come into the wood, behold, the honey dropped; but no man put his hand to his mouth."

Jonathan, however, tasted of it. It has the name of *honey dew*, and is formed by the insects called by naturalists *Aphides*. It was made so copiously upon the leaves of the trees that it flowed upon the ground. It is with us the favorite food of the ant, and when we see ants going in squadrons up trees, we may be sure, according to Jaeger, that the *aphis* has there been at work.

I shall now say a few words in regard to the trees which were grown in the gardens of the Israelites. You observe that I use the term Israelite in referring to the time before the captivity, to which all of my remarks, unless otherwise stated, relate. Scholars have made a difference between the terms Hebrew, Israelite and Jew. The Hebrews constituted the families of the patriarchs before the emigration to Egypt; they came out of Egypt in the Exodus as Israelites; and are so denominated until the return from the captivity, when they appear as Jews.

The olive was early known. Jacob, after his dream of the ladder, arose at dawn, set up a stone (Gen. 28:18) as a memorial, and poured olive oil upon it. The best oil was obtained not from the ripe fruit, but from the green fruit which was beaten and then pressed. The oil of the beaten olive was not eaten but was used for the tabernacle lamp, (Ex. 27:20), for ointment, when mixed with spices, and when mingled with cakes for the sacrifices. (Lev. 6:12). The oil from the mature olive was inferior and was eaten. In the press for the olive called *Gath Shemen*, the oil was trodden out by the feet (Micah. 6:15). The amount of oil from a single tree sometimes was above a thousand pounds. The later times of the Israelitish kingdom when the ancient laws regulating commerce with neighboring nations were relaxed, saw the Israelites trafficing in olive oil, honey and balsam with Tyre, (Ezek. 27:17). The tree flourishes best in high, dry and sandy soils. It covers even yet many eminences in Judea where it lends but little charm to the landscape on account of its straggling branches. It is said to bear fruit and live about six hundred years. The tree was grown from transplanted suckers. The wild olive tree referred to by St. Paul in the 11th of Romans is the *Oleaster*, whose branches were grafted into cultivated but barren olive trees in order that the barren tree might bring forth.

Pomegranate. The pomegranate was a lowly shrub, bearing a beautiful and luscious fruit about the size of an apple. It is interesting in view of the theory of Rev. Chas. Foster, that it was the fruit which our first parents ate in Eden and which brought all our woe. He supposes that it was in reference to that act that the pomegranates of blue, purple and scarlet were put about the hem of the high priest's

robe. The reverend gentleman does not know probably that he was anticipated by the Rabbis. According to Rabbi Meir, in the Midrash, fol. 7, that tree was the wheat tree. The belief was that wheat once grew into a tree, and its grains were as large as the eggs of an ostrich; in Enoch's time they dwindled to the size of goose eggs; in Elijah's time to the size of hens' eggs; in Pilate's time to the size of grapes; and afterwards to the present size. Rabbi Joseph says that our first parents plucked the fruit of the fig; and there was a poetic justice in making them use the leaves to hide their nakedness; Rabbi Judah declares that the tree was a grape vine. This view was common among the Jews and it may have been in oblique reference to it, to impress it upon his hearers that Christ, the second Adam, speaks of himself as the vine and his disciples the branches. The story that the sinful fruit was an apple originated with Rabbi Aba. The orange seems to have been unknown to the Jews as an original production, as there is no Hebrew word for it.

Palm. The Israelite coins represent as typifying the peculiar products of Palestine, a palm tree, a sheaf of wheat, and a cluster of grapes. The palm tree is so well known in pictures and descriptions, and as the producer of the date, that I need not dwell upon it. The dates ripen early in autumn, are collected and eaten, or are pressed and dried. The expressed juice left to ferment forms the celebrated date wine. The palm flourished best in low and well watered situations. The tree is dioecious, and requires human care. The pollen from the barren tree was transferred by skilled and intelligent palm trainers at the proper time. The palm was among the Israelites the type of religious purity, as the cedar was the type of prosperity. "The righteous shall flourish like the palm tree, he shall grow like a cedar in Lebanon." It was also used as an emblem of victory and peace. When Christ entered into Jerusalem the people went forth to meet him with branches of palm trees. It is remarkable that comparatively few palms are now to be found in Palestine, although Josephus informs us that some of the cities of South Palestine in his days were embowered in its shady groves.

The Fig was and is common throughout Palestine, where it attained a lofty height. The tree was cultivated in gardens and vineyards. In Luke xiii, we perceive the manner of its cultivation: "A certain man had a fig tree planted in his vineyard; and he came and sought fruit thereon, and found none, then said he unto the dresser of his vineyard: Behold, these three years I come seeking fruit on this fig tree and find none; cut it down; why cumbereth it the ground? And he answering said unto him: Lord, let it alone this year also, till

I shall dig about it and dung it; and if it bear fruit, well; and if not then after that shalt thou cut it down." The fig tree leaves about the first of April, indicated by the words of Christ in Matt. 24:32: "Now, learn a parable of the fig tree; when his branch is yet tender, and putteth forth leaves, ye know that summer is nigh." There are three varieties of the fig: The *untimely fig* which ripens about the 1st of July, called in Hosea 9:10, and Jer. 24:2, the *first ripe fig*. The *summer fig* ripens about the middle of August; and the *winter fig* in December, when the leaves have fallen. Figs were dried and preserved. If the fig was preserved prior to Jacob's going down into Egypt, it was not deemed of sufficient importance to form part of the "best fruits of the land" which were sent down as a present to Joseph by his father. The present consisted of "a little balm, and a little honey, spices, and myrrh, nuts, and almonds." (Gen. 43:11). The shade of the fig tree with a huge vine trained over it, was very grateful in this sultry land, the type of contentment, ease and prosperity, being represented in "sitting under one's own vine and fig trees."

Turning from arboriculture let us devote a brief space to the viniculture of Palestine. The vine was in a high state of cultivation in Canaan before Moses led the Israelites out of Egypt. It has been known to attain a thickness of a foot and a half, and a height of thirty feet in our own day. The weight of the clusters has been found to be as great as twelve pounds. The spies who were sent up from the desert to inspect the land brought down thence a cluster of grapes, and they bare it between two on a staff. (Num. 13:23). This precaution was doubtless necessary. It is not meant that the cluster was too large or too heavy to be borne by one man; but that one man would not be likely to carry it without bruising it. The Rabbis, however, are not satisfied with so tame an explanation. Rabbi Joshua ben Levi says he saw bunches of grapes in a vineyard near Gabla, as big as calves, and he cried out, "The calves are in the vineyard." Rabbi Chija says the clusters were of the size of goats. The spies are said to have reported that the *largest* cluster of grapes was more than a load for a camel; one ear of wheat would feed a family; one pomegranate shell would hold five armed men.

The situation, protection, and care of the vine is well stated by Isaiah 5:1, 2: "My beloved hath a vineyard in a very fruitful hill, and he fenced it and gathered out the stones thereof, and planted it with the choicest vine, and built a tower in the midst of it, and also made a wine press therein." It was common to plant on the hills; hence the saying of Amos 9:13, "The mountains shall drop sweet wine;" and of Jer. 31:5, "Thou shalt yet plant vines upon the mountains of Samaria;

the planter shall plant, and shall eat them as common things." The vines that grew in the low lands were generally raised by the original inhabitants of the land, whom the Israelites never entirely dispossessed. The Israelites were emphatically a hill people, and could not meet in battle with uniform success the cavalry and the war-chariots of the dwellers of the plain. The wall of the vineyard was built to retain the soil upon the mountain rocks. The propagation of the vine was by suckers. It was allowed to run along the ground, as is evident by the "spreading vine of low stature," mentioned in Ezek. 17:6. It was also trained upon espaliers, and upon trees, especially the fig, the density of whose shade it increased. The tower was built for the keeper whose duty it was to prevent the depredations of thieves, jackals and foxes. "Take us the foxes, the little foxes, that spoil the vines," says Solomon's Song. 2:15. Some of these towers were immense structures. Schultz mentions some even now thirty feet on each side and over eighty feet high. "There was a certain householder," says Christ in Matt. 21:33, "which planted a vineyard, and hedged it round about, and digged a wine-press in it, and built a tower, and let it to a husbandman and went into a far country." It was an easy matter to dig a wine-vat on account of the sloping and limestone hill sides. Occasionally the press was made of stones and plastered. It contained an upper *reservoir*, called *gath*, or press, about four feet deep and large enough for the movements of five men who held cords suspended from a beam above for the purpose of self-support, and who trod out the grapes to the sound of the tabret or to the loud *yoho*, (*hedhadh* in Hebrew) of the laborers. Of course, the clothes of the treaders were stained with the "blood of the grape." Some of the sublimest imagery of the prophets is borrowed from this, as from every agricultural employment of this rural people.

"Who is this that cometh from Edom, (says Isaiah 63:1-3) with dyed garments from Bozrah? this that is glorious in his apparel, traveling in the greatness of his strength? I that speak in righteousness, mighty to save. Wherefore art thou red in thine apparel, and thy garments like him that treadeth in the wine-vat? I have trodden the wine-press alone; and of the people there was none with me; for I will tread them in mine anger, and I will trample them in my fury; and their blood shall be sprinkled upon all my garments and I will stain all my raiment."

The new wine was placed in new leathern bottles, lest the fermentation should rend them, or enclosed in large jars and placed in the ground to preserve its freshness. Some of the jars were very large—large enough to contain a man, as is evidenced in the case of Diogenes

who was said to have lived in one, and not in a *tub*, as the word, which is of Hebrew origin and export, has been erroneously translated. There were three vintages in the year, and the occasion was always one of great festivity. Pruning of the vine was well known even in the time of Moses. The pruning was done in March, April and May, three times a year. It was contrary to the law to eat of the grapes until the fifth year, and in every sabbatical or seventh year, Moses enjoined that the vineyard should not be pruned.

It is often questioned whether the wine of the old Testament was sufficiently fermented to produce intoxication. It is due to the cause of truth to say that *yayin*, which is the commonest Hebrew word to denominate wine, means primarily, "fermented liquor." Besides, instances in the Bible too numerous to quote in full record the usual phenomena of drunkenness. "In the days of our king," says Hosea, 7:5, "the princes have made him sick with bottles of wine." "Woe unto him," says Habakkuk, 2: 15, "that giveth his neighbor drink, that puttest thy bottle to him and makest him drunken also." The Rabbis relate that when Noah was about to plant the vine, Sammael, which is the Talmudical name for the devil, appeared to him, and sacrificed over the shoot, a lamb, a lion, and a hog, remarking that one drink would make a man gentle and lamblike, two drinks make him furious and lionlike, ank three krinks filthy and bestial as the swine.

Among the early Hebrews there seems not to have been much attention given to the cultivation of the field. Abraham, the original immigrant from Ur of the Chaldees was but the ancient type of the Bedawin of the present, who lead their flocks about from day to day in search of ever fresh pasturage. Jacob's sons were pasturing their flocks in Dothan when Providence ordered the forging of the first link in the chain of events which brought his whole house down into the land of Egypt. It was necessary that the depositaries of the true faith should be an agricultural people, and it was equally necessary that the rudiments of agricultural knowledge should be learned in that wonderful land of open and esoteric wisdom. There the arts and sciences had received their highest development; geometry and engineering had achieved their mightiest wonders; every species of literature, the poem, the drama, and even the novel, treaties on geography, biography, history, art and agriculture had been inscribed on the monuments. The irrepressible genius of this enlightened people had wrought out the most wonderful invention of the human mind: I mean the invention of the written alphabet, which, under various forms, has filled the literary wants of every age and nation. The standard of perfect knowledge was to be educated, like Moses, "in all the wisdom of the Egyp-

tians." The dazzling civilization of this remarkable people culminated in its scientific agricultural system. The river Nile began to swell in June and spread its fertilizing silt over the land. "The construction of dikes and the mechanism belonging to them, the regulation of the supply of water admitted into plains of various levels, the report of the exact quantity of land irrigated, the depth of the water and the time it continued upon the surface, which determined the proportionate payment of taxes, required much scientific skill; and the prices of provisions for the ensuing year were already ascertained by unerring prognostics of the existing inundations. Egypt was also a great manufacturing country, "famed among foreigners, for her cotton and woolen stuffs, cabinet work, porcelain, glass and numerous branches of industry." The ignorant and despised shepherd doubtless looked upon the miracles of this bustling civilization with surprise and awe. But the centuries of their residence and their servitude were but a time of formation for a glorious destiny. A man of science steps forth to the front and champions the oppressed. With the strong right arm of Omnipotence extended in his aid, he lifts the heel of oppression, and in the desert of Sinal, taught the slaves of a jealous despotism the divine doctrine of a theocratic commonwealth, the fundamental idea of which was agriculture. There in the desert was enacted the most singular spectacle in the history of the world. A people, houseless, homeless, and wandering, was instructed in a polity and taught a constitution when as yet they had no country. The land of "milk and honey" seemed a sweet and glowing illusion. It was parcelled out before it was seen. Every family was to have its own farm, which it held on a divine tenure. "The land is mine," saith the Lord. It could not be sold, confiscated or escheated to the crown, unless under the violent and infamous acts of an idolatrous Ahab. The sturdy Naboth was to represent the attachment of the Israelite farmer to the home of his inheritance. The hardiest patriotism was to be inculcated by the principle of property. No grandees, rich and grinding, were to extend their acres and lord it over God's poor; no absenteeism and landlordism and miserable tenantry were to bring the land to famine and poverty; no "bloated bondholder" was to buy at 40 per cent., sell at 140 per cent., and draw his interest at par in gold in this paradise of grangers. Commerce was to be checked and marriage prohibited with the Canânite lest idolatry should raise its horrid front where the Schechinah of the Lord of Hosts shed forth its terrible raidance. Emboldened by the prospect the slave of yesterday moves tremblingly forward to conquer his future fortune. Information is desired of the country and its defenders. We have seen that the spies brought great clusters of grapes from Eschol. They also,

brought back news that made the hearts of the people quake: "The people is greater and taller than we; the cities are great and walled up to Heaven." Consternation, such as moved the host of Cæsar at the terrible aspect of the gigantic soldiers of Ariovistus, seized the camp. Echoes of the stories that were banded throughout the army are reported in the traditions of the Talmud in the treatise *Berachoth*.

I shall but once more try your patience with these marvels. There was an enemy, says the Talmud, named Og, King of Bashan. He was so tall that, in the time of the flood, he climbed upon the top of Noah's Ark, and thus was saved alive. His weight was so great that the ark threatened to sink, and Noah was obliged to throw overboard the rhinoceros and the hippopotamus to preserve the ship. Og heard of this emigration from Egypt and determined to destroy Moses. The Bashan King had built sixty cities in Argob, and the smallest was actually walled up to Heaven, being sixty miles high. He could sit on the wall and his feet would touch the ground. His usual meal was one thousand oxen and a thousand wild roes, and his usual drink a thousand hogsheads. One drop of his sweat weighed thirty-six pounds. The sole of his foot was forty miles long. Once in a quarrel with Abraham one of his teeth fell out. Abraham took the tooth, made a bed out of it and slept in it. Such was the character of the imaginary enemies of the ignorant and simple-minded sons of Israel. It may be interesting to digress and learn how Moses met this redoubtable warrior. The Talmud records that Moses was but eighteen feet high, and was attacked by Og with a hatchet whose handle was eighteen feet long. Moses made a spring in the air, high enough to strike Og on the ankle. Og seized a mountain to hurl at Moses; but some ants instantly ate out the inside of the mountain, and it fell over Og's head up to his neck. He could not pull out his head, for his teeth suddenly grew into tusks and pushed through the mountain. He was entrapped and Moses slew him.

The land of Canaan was worthy of the contest. The climate was not so oppressive as that of Egypt. The isothermal line of the mean annual temperature of Jerusalem passes through Louisiana. The land was rich and fruitful, diversified with hill and valley and "drank water from the rain of heaven." Snow was infrequent in the plains. There were many forests scattered throughout the country, affording excellent timber. A change had taken place before the era of the N. T. in the fertility of the soil, on account of the destruction of the forests, which retained the moisture in the ground, and on account of the decrease of skilled labor. But even then its fertility was immense. Josephus records that of the 300 villages in the neighborhood of the Sea of Gal-

ilee, there was none that had under 15,000 inhabitants. The houses were not built of timber but of stone or tiles. The walls were plastered. Wood was not, under ordinary circumstances, even used for burning, but hay, stubble, and the refuse of animals. Wood was used for doors, gates, window lattices, flat roofs and wainscoting. The kinds of wood employed were generally sycamore and fir.

The most honorable employment in the State was tilling the soil. The owners of the land in the heroic age, as in the Odyssey in the case of Laertes, the father of Ulysses, were not ashamed to work in the field. Boaz, the rich Bethlehemite, winnowed barley by night on his own threshing floor. Elisha was plowing with twelve yoke of oxen when Elijah called him to the prophetic succession. The natural fertility of the soil was carefully preserved by the manures most approved in modern times. Irrigation was effected by means of canals, communicating with rivers, brooks, springs and fountains. The grain and pulse cultivated were wheat, millet, spelt, barley, beans, lentils, cumin and rice. Flax and cotton were also raised. Oats are not mentioned in the Bible. The word *rye* occurs twice in our version, but is wrongly translated. The Hebrew word *kussemeth* exists to-day in Arabic and there means *spelt*, a grain very much like wheat and which is grown to-day in South Germany.

The earliest harvest was that of barley, which took place in April. It was used among the poor for baking into bread and cakes, often mixed with pulse. It was also mixed with straw and fed to horses. We can gain some conception of the poverty of the Savior, when we hear of the five barley loaves with which he miraculously fed the multitude. In Arabic the term of contempt for a mean and poverty-stricken wretch is expressed by calling him "a cake of barley-bread." This will help to explain the passage in Judges, 7:13:

"And when Gideon was come, behold, there was a man that told a dream unto his fellow, and said: 'Behold, I dreamed a dream, and lo, a cake of barley bread tumbled into the host of Midian, and came unto a tent, and smote it that it fell.'"

Gideon is thus obscurely hinted at, whose "family," says the preceding chapter, "was poor in Manasseh." Wheat and barley were sown in the winter. The wheat of Palestine was of a very superior kind, and in good ground produced a hundred fold. It was sown broadcast, and trampled in by cattle or sown in furrows, and covered by plowing cross-furrows. The crops were subject to what is called in the Bible *mildew*, which was the turning yellow of the corn, from easterly winds, causing it to decay. *Blasting* resulted from frost, causing the crop to fail to ear. The fields were guarded by watchmen to drive

off thieves and animals. As the farms were not generally fenced in, but had their boundaries indicated only by landmarks, this was a necessary precaution. The wayfarer, however, might eat his fill from field or vineyard. A "corner" of the field was left for the poor, consisting of about one-sixtieth of the crop. If a sheaf was forgotten in the harvest it could not be afterward removed.

The Mishna, in its article on the "corner," gives very minute particulars as to when the corner is due and when not, of the grapes and olives to be left, what sheaf, or olives or grapes may be forgotten and what not. The Pharisees objected to our Lord's disciples plucking corn but only on the Sabbath day. In the harvest either the sicle was used or the grain was plucked up by the roots. Men and women reaped the field. The first handful of ripe barley was brought to the altar, as the offering of first fruits. The grain was bound in sheaves, heaped into carts and carted to the threshing floor. Four-wheeled wagons were unknown to the Israelites. The time of harvest was a festival, lasting from the Passover, seven weeks until Pentecost. The threshing floor was in an elevated part of the field, without walls or roof, forming a circular area of about fifty paces in diameter. The ground was leveled and beaten hard. The grain was threshed out with flails, or trodden out by unmuzzled oxen, or by a machine mentioned in Isaiah, which consisted of a square frame with revolving cylinders let into the sides. These cylinders were shod with iron, indented like a saw. The drivers sat upon them and crushed the straw. A favorite figure of the prophets is borrowed from these instruments, as, in fact, the literature of the Israelites having reference to argricultural implements and operations would fill a volume. Says Isaiah 41:15:

"Behold, I will make thee a new, sharp threshing instrument having teeth; thou shalt thresh the mountains, and beat them small, and shalt make the hills as chaff."

The national agricultural habit, underlying and supporting the national religion was fitly and strikingly represented in the erection of the Holy Temple upon the threshing floor of Ornan the Jebusite.

After the grain was threshed, it was piled up in the midst of the threshing floor. It was then winnowed by being exposed to a gentle wind, that the chaff might be carried away and the floor purged. It was thrown up in fans or with forks. The scattered straws served as provender for cattle; the wheat was put away, after being sifted to remove filth, into subterranean garners. John the Baptist used this familiar process in a figure:

"Whose fan is in his hand, and he will thoroughly purge his floor, and gather his wheat into the garner."

And Christ refers to the sifting in Luke 22:31:

"Simon, Simon, behold, Satan hath desired to have you that he may sift you as wheat."

Many of Christ's sayings and some of his parables are formed on agricultural operations, operations familiar to his unlearned auditory, and in this respect they differ largely from the parables of the Talmud. I instance those of the Sower who went forth to sow; The Wheat and the Tares; The Mustard Seed; The Seed cast into the Ground, and The Laborers in the Vineyard.

The first implement of husbandry was a pointed stick. The pick was the natural offspring of this rude tool, and the early plow was a forked limb of a tree, the shorter branch of which was hardened in the fire and the longer branch attached by a yoke to the draught animal. Spades, shovels and hoes were known in the time of Moses. The plow was a very rough instrument, requiring the constant attention of the plowman. The danger of looking back when one's hand was once put to the plow grew into a proverb and may be appreciated in consideration of this fact. Such a tool could make but a bare scratch in the ground, but so fresh was the youth and great lustiness of the soil that it needed but to be "tickled to laugh back in roaring harvests."

The harrow was a flat log of wood on which the driver sat and drove over the plowed field. The field after the sowing was often brushed with brushes of thorn. New land was plowed twice. The plowman held the pole about eight feet in length on the one end of which was a flat iron blade for cleaning the plow, and on the other end a sharp spike for stimulating the oxen. This ox-goad was sometimes used in battle. The horse was not used for plowing, but bulls, cows and asses. The ox was not known until after the captivity. In estimating Job's wealth, it is said he had five hundred yokes of oxen, i. e., bulls, and five hundred she asses. Wherever the ox is mentioned in our version, the bull is meant in the Hebrew, excepting in a few cases in the latter prophets. The rotation of crops was recommended and practiced. The Mishna devotes a chapter called "Mixture" of its contents to the regulation of sowing seeds; to the distance between every species; to the division between garden beds and fields; to the distance between vines planted in wheat-fields from one another and from the wheat; between vines planted against hedges, walls or stakes. The grain was carefully sifted before sowing in order to extract the seeds of different species. If a field was sown with mixed seeds, the crop could not be sold, but had to be given to the priests. Hence the loss

of the crop to the man mentioned in Mat. 13:25, in whose wheat-field an enemy had sown tares.

In conclusion, I desire to give utterance to a thought or two: First, as to the small extent of the territory. On almost any high hill of Judea the traveler can see the whole boundaries, on all points of the compass, of the ancient territorial possession of Israel. Secondly, the ancient attachment of the Israelite to the country, and his reluctance to dwelling in cities. So strong was the love of the farm that even on the return from the captivity, one in ten of the people had to be drafted to fill the waste places of Jerusalem, the holy.

It was then that commerce began in earnest. The enterprising Solomon had traded with but few ports, but now, after the Jew had embarked in traffic, he distanced all competitors. The proud city of Tyre became jealous of the energy of the Jewish merchants. Ever since the tact and business ambition of the Jew have given him success in every walk of trade, and in any one trade, even if, as in Germany under the Hohenstauffen, his business be confined to dealing in old clothes. But the Jew has never returned to agriculture, the love of his fathers. His literature, however, is a country literature. "The Bible is not a city book—its scenes are mostly laid in the country * * * there, most of it was thought, felt, spoken, acted and written; we are scarcely introduced to city life for the first three thousand years of Bible chronology. The Pentateuch was composed in tents; and even after the reader is led forth to dwell in tabernacles with patriarchs, or in deserts with prophets and apostles. The warm breath of its psalms and odes that accord with the harp's dulcet stains, smells of the dew of herbs and the aroma of the morning."

This book, thus written in the country, "is the foundation of all literature, the *origines* of all authentic history, the shrine of the primeval revelation, the register of the eternal covenant of grace, and the panorama of those sacrosanct emblems which shadowed out * * * Him, of whom Moses in the Law, and the prophets did write."

COUNTY REPORTS.

ADAIR COUNTY.

Adair county is most favorably located in the second tier of counties south of the Iowa State line, and on the third tier west of the Mississippi river, and has a population of 15,190.

RAILROAD FACILITIES.

It is easy of access from all directions, as the Wabash, St. Louis and Pacific Railway, with its many connections, intersects the county from north to south, and Kirksville is the present terminus of the Quincy, Missouri and Pacific Railway. A glance at the map will show the facilities afforded by these lines for the direct shipment of grain and produce of all kinds to the prominent markets of the country, as well as the importation of merchandise, a lively competition for freight preventing the high tariffs which frequently absorb the hard earnings of the farmer in counties where one line of railroad has full sway to dictate rates.

LAND, SURFACE, SCENERY AND TIMBER.

The general surface of the county is undulating, agreeably interspersed with hill and dale. Something over one-half of the county consists of rolling prairie land and the remainder is covered with a luxuriant growth of timber of the best varieties, among which may be mentioned oak, walnut, hickory, linden, or bass-wood, and hard and soft maple.

IRRIGATION AND WATER-POWER.

The county is plentifully and abundantly supplied with water. The Chariton river, a fine, swiftly-running stream, with innumerable good water-power sites, divides the county from north to south through its western part, while Salt river, a smaller stream, takes the same course in the eastern half of the county.

CHARACTER OF LAND AND PRODUCTIONS.

The lands are rich and fertile, producing large yields of wheat, corn, rye and oats, all the varieties of fruits usually to be found in this latitude, and are especially adapted to the growth of clover, timothy and genuine blue grass, the richness, abundance and variety of its pasturage particularly recommending it as one of the best grazing districts in the State.

ANDREW COUNTY.

Population, 16,315. Andrew county is bounded on the north by Nodaway county, on the east by Gentry and DeKalb counties, on the south by Buchanan county, on the southwest, for about twelve miles, by the Missouri river, and on the west by Holt county, the Nodaway river being the line between the two counties for the greater portion of the mutual boundary. It is almost square, being about twenty miles from one boundary line to its parallel, and its area comprises about 273,025 acres.

PROPERTY VALUATION AND FINANCE.

The valuation of property in the county, as returned for taxation for the last year, totals $4,617,778. The taxation is very low. The county does not owe a dollar, is perfectly free from debt, and has learned the lesson of economy from experience, having paid nearly a quarter of a million of railroad bonds, and a debt is not likely to again occur in the history of the county until the old generation has passed away and the constitutional provision prohibiting counties from going into debt shall be removed.

MARKETS, RAILROAD FACILITIES, ETC.

An important matter for consideration, in computing the value of a country, is the means a country has to place the surplus products in a market where they will command a ready sale at good prices. The city of St. Joseph, an enterprising commercial and manufacturing city of 40,000 inhabitants, is only about one mile south of the southern boundary, and within six hours drive over generally good wagon roads, of the most remote portions of the county. So situated, butter, eggs, poultry, vegetables and marketing generally, always commands good prices. Savannah is also a good market for produce of various kinds, and goods may be bought there at as low prices as any city in the west. The Kansas City, St. Joseph and Council Bluffs Road, running through the southwest portion of the county, gives eastern, western and southern connections at St. Joseph and Kansas City, Missouri, and at Atchison, Leavenworth and Topeka, Kansas, and northwest connections at Council Bluffs. In addition, the Maryville Branch of the same road, starting from the main line at Amazonia, on the Missouri river, and running north through the central portion of the county, on and into Iowa, connecting at Creston, Iowa, with the Chicago, Burlington and Quincy Railroad, affords direct communication with Chicago. The St. Joseph and Des Moines Narrow Gauge Railroad passes through the eastern portion of the county.

LOW PRICES OF LAND.

Unimproved and improved lands in Andrew county can be purchased at exceedingly low prices. Unimproved land, in a good neighborhood, convenient to churches and school houses, and of as rich soil as can be found anywhere, can be bought as low as ten dollars, and ranges from that to twenty-five dollars. Improved lands range from ten dollars to seventy-five dollars an acre, according to location and improvements. It is conceded everywhere that the "bottom" has been reached in financial matters.

Andrew county, upon a whole, has reason to be, and is proud of what she is able to offer new comers. Rich soil, convenient markets, congenial people, good educational laws and schools, health and happiness, with bright prospects ahead, in improvements and all railroad conveniences, Andrew claims to be the banner county of the famous and world renowned Platte Purchase.

ATCHISON COUNTY.

Population, 14,565. Atchison county, the extreme northwest portion of Missouri, includes an area of 329,752 acres in that proverbially rich and fertile section of the State, known as the Platte Purchase. It is bounded on the north by Iowa, on the east by Nodaway county, on the south by Holt, and on the west by the Missouri river, which separates it from Nebraska.

The topography of this county includes three distinct classes of territory, familiarly known as the bottoms, the bluffs, and the rolling prairies. The bottoms, a peculiar features of this section of the State, extend along the center western boundary of the county, in a belt varying from two and a half to eight miles in width, and are nearly all in cultivation, or fenced in in large tracts of pasture lands. The bluffs, which afford a pleasing relief to the otherwise monotonous aspect of a vast plain laden with exuberant crops of corn, constitute the narrow dividing line between the inexhaustible fields of this bottom land and the high rolling prairies, which extend eastward to the heavily timbered bottoms of the Nodaway river in the adjoining county of Nodaway.

TIMBER.

Atchison is essentially a prairie county, and timber is by no means a prominent feature of its general aspect. The supply, however, is ample for the necessary local demands of fencing, fuel, etc., the banks of the Nishnabotna, the Big Tarkio, and numerous other streams of minor import which vein the area of this fertile section, are all clothed, more or less, with cottonwood, walnut, box elder, water maple and other timber of corresponding value.

WATER.

Besides the ample system of inexhaustible streams which afford ample stock water for the vast herds of cattle that roam over her plains, for it is a rare thing to find in Atchison county a quarter section of land absolutely without such water, the supply for domestic purposes is readily obtained by boring at a depth of from twelve to forty feet.

SOIL.

The general character of the prairie, which includes an area of argely over two hundred thousand acres, is a black vegetable mould, arely less than two and often over four feet in depth, yielding with he exceedingly slight cultivation it generally receives, crops of corn ıot inferior to the yields of the celebrated Miami and Sciota valleys of Ohio. The subsoil of the uplands is a rich lacustrine deposit peculiar .o the rich slopes of the Missouri river. The bottoms nearly all con- ıtitute what is called in this country "made lands," and not a native formation. Hundreds of years of tillage will be insufficient to exhaust the incomparable richness of these lands.

CHEAP LANDS.

The question is frequently asked, why is land on the woodless prairies of Kansas and Nebraska sold for such higher prices than the magnificent grain lands of northwest Missouri, and their contiguity of excellent timber? The answer is simply from the fact that Kansas and Nebraska have been industriously advertised, while northwest Missouri, in every respect a better country, is scarcely known abroad in its true character. The inexhaustible soil of Atchison county, to whose native resources we have already referred, may be purchased in its native state at from three to ten dollars per acre; and the same at from seven to eighteen dollars, with good improvements. Twenty-five dollars per acre is an extraordinary price for the best improved land in the county.

RAILWAY AND SHIPPING FACILITIES.

The Kansas City, St. Joseph and Council Bluffs Railroad traverses the entire western section of the county, connecting with the great trunk lines east and west. An extension of the Clarinda Branch of the Chicago, Burlington and Quincy is projected, and will doubtless be built at an early day. The main shipping points in the county at present are Phelps City and Watson, to which we shall presently refer.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre
Wheat cultivated	40,000	16 bushels.
Corn cultivated	216,375	60 bushels.
Oats cultivated	32,375	35 bushels.

1881.

Articles.	No. of acres.	Yield per acre.
Wheat harvested	15,000	9 bushels.
Corn cultivated	60,000	25 bushels.
Oats harvested	6,000	20 bushels.
Flax cultivated	1,000	
Barley cultivated	8,000	20 bushels.
Apples	800	200 bushels.

Remarks.

Crops injured by cut-worms and drouth; about one-fourth of the land not cultivated because of being flooded in early spring.

AUDRAIN COUNTY.

Population, 19,760. This county, one of the newer counties of Northeastern Missouri, was settled as late as 1829, and formally organized in 1836. It has an area of 690½ square miles—441,927 acres—is located about thirty miles west of the Mississippi, on the divide between the Mississippi and Missouri rivers, in the latitude of Cincin-

nati and Washington, has a mean altitude of eight hundred feet above the sea level, and is bounded by Pike, Ralls, Monroe, Randolph, Boone, Callaway and Montgomery counties. Eighty per cent. of the county lies upon the "Grand Prairie," the remaining twenty per cent. being covered with well-wooded forests of oak, hickory, ash, elm, walnut, sycamore, maple, hackberry, cottonwood and linden, the forest lying along the numerous streams, and giving an abundant supply of timber and fuel to every township in the county. The county is rich in other natural resources.

Coal of excellent quality underlies three-fourths of the county, cropping out in eighteen to thirty-six inch veins along the streams and is easily worked by "stripping." Every township is supplied with massive quarries of limestone of free stratification and fine quality for building uses. A score of streams with numerous springs and spring-brooks, living wells, cisterns, and artificial ponds give an abundant and well distributed water supply. The graceful prairie undulations, high, rolling woodlands, intervening valleys, ravines and intervals make up a most charming landscape and give admirable natural drainage to the entire county. There are no malarial-breeding swamps, marshes or lagoons, and the pure water and pure, invigorating atmosphere of this divide, or water-shed, gives a high average of health to man and beast. The surface soil of the county is generally a dark alluvial, rich in humus, from ten to thirty inches deep, rich and flexible, easily worked and very productive. The subsoil is rich in siliceous matter, lime, magnesia, alumina and organic matter, and in conjunction with the surface soils, forms the most indestructible and versatile basis for agriculture known to husbandry.

NO WASTE LAND.

There is no land of this description in Audrain county, full ninety per cent. of the lands being available to the cultivator and the remaining ten per cent. adapted to blue grass and white clover from the water-line to the crown of the sharpest hill. Every farm in the county is well suited to the use of farm machinery, and farm-work is never hurried or confused.

The transportation facilities are unusually fine. There are eighty miles of railroad and ten shipping stations within the county, so well distributed that three-fourths of the producers are within five miles of a railroad station. The main lines of the Chicago and Alton and Wabash, St. Louis and Pacific railways cross the entire county, giving the producers and shippers easy, quick and cheap command of Chicago, St. Louis, Kansas City, and the entire railway system of the country.

A branch of the Chicago and Alton runs from Mexico, the county seat, to Jefferson City, the Capital of the State. The probable early completion of the Hannibal and Mexico railway will add materially to the superior facilities above mentioned.

COUNTY FINANCES.

The county has been admirably managed. Though upwards of $600,000 have been expended by the county in the last dozen years for railroads, county buildings, bridges and other improvements, the county is practically out of debt The entire county indebtedness amounts to only $20,000, all due in 1881, and the county treasury holds the surplus cash to cancel it at maturity. Upon a total valuation of $4,849,113, the entire tax levy (including a three-mill tax for county school purposes) is but $1.24 on the $100, (one and one-fourth per cent.)

PRICE OF LANDS.

In addition to the resources and advantages named, the low price of lands will also prove an attraction to immigrants. Good wild prairie and timber lands, admirable for cattle and sheep ranches, fruit or grain farms, are in the market at four to ten dollars per acre. Improved farms, forty to one thousand acres in extent, are selling at eight to twenty-five dollars per acre, the price being governed by soil, location and permanent improvements. Considering the location, quality and productive capacity of these lands, they are among the cheapest on the Western market.

Crop Report.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	82,300	12 bushels.
Cultivated in wheat	5,000	8 bushels.
Cultivated in oats	50,000	30 bushels.
Cultivated in timothy	80,000	1 ton.
Cultivated in flax	5,000	12 bushels.

BARRY COUNTY.

Population, 14,434. Barry county is situated in the southwestern part of the State, and is bounded on the east by Stone county, north by Lawrence county, west by Newton and McDonald counties, and south by the State of Arkansas.

AREA AND PRODUCTIONS.

There are 806½ square miles, or 516,160 acres of land in the county, about three-fourths of which is susceptible of cultivation, and adapted to the production of wheat, rye, oats, potatoes, sorghum, cotton and grass, and the crop of tobacco succeeds as well as in Virginia or Kentucky. Fruits of almost every variety succeed well, especially apples.

IRRIGATION AND WATER FACILITIES.

The county is well watered by the Big and Little Flat creeks, Sugar, Joyce, Shoal and Payne's creeks, and White and Roaring rivers. The latter stream is a natural curiosity, having its source at a spring about two hundred feet deep. Bursting out from under a mountain, it runs in a southeasterly course twenty miles, and empties into White river. It furnishes an abundance of water-power for mills, factories, etc., and two large flourishing mills are already located upon it. The water is as clear as crystal, and cool enough to drink the hottest summer weather. White river has been navigated, by small boats, as high up as the mouth of Roaring river, near the village of Golden in this county. There are no factories in the county now, and the openings for business of this description are unexcelled.

TOPOGRAPHY.

The eastern portion of the county is broken and hilly, with small valleys interspersed, in which the richest and most productive soil is found. This part of the county possesses an abundance of oak, and some pine, cedar and walnut timber. In the middle and western parts of the county, high rolling timber and prairie lands characterize the country.

PRICE OF LAND.

There is very little government land left, but a large amount of private and railroad lands may be obtained for two to five dollars per acre, while improved lands sell at from five to twenty-five dollars per acre.

RAILROAD FACILITIES.

The St. Louis and San Francisco Railroad, which runs along the northern boundary of the county, affords ample shipping facilities to the farmer and merchant.

LEAD MINING.

Deposits of ore are found in limited quantities in the eastern portion of the county, which, if developed by the capitalist, would amply reward the outlay.

BARTON COUNTY.

Population, 10,332. Barton county lies in the western tier of counties, bordering upon Kansas, and has an area of 580 square miles, or 375,000 acres. The face of the country is much like that of the neighboring country of Kansas, about ninety per cent. being graceful prairie lands, here and there broken by charming little valleys, coursed by clear winding streams, fringed with groves of timber.

THE CHARACTER OF SOIL.

The soil is generally a rich, dark alluvial, nearly identical with the prevailing prairie soils of Illinois, with occasional districts of gray and chocolate colored soil, each and all of them being deep, flexible, dry, easily managed, and very productive. In the valleys and bottoms, the black alluvial, common to all the western bottoms, is from three to six feet deep, and absolutely inexhaustible.

The timber supply is ample for all local needs, and admirably distributed over the county, on numerous water courses, such as Spring river, the Dry Woods, Pettis and other creeks; which, together with numberless clear springs, furnish the county with a never-failing supply of water for all purposes.

COAL AND BUILDING MATERIAL.

For fuel the settler has only to turn to the almost inexhaustible coal fields. Eminent geological authority estimates the coal measures of the county at 480 square miles in extent, with the average thickness of vein at four feet, and a large district underlaid with a vein of from six to seven feet thick, and of the best quality of soft coal. Here also is found a large supply of lime and sandstones for building purposes.

FRUIT CULTURE.

As a fruit country, Barton county must always take high rank. The dryness and richness of soil, equability of the climate, and mean elevation, all give a high measure of excellence to all the fruits of this latitude. Apples, cherries and plums, all reach perfection here, in size, color, texture and flavor. The peach does splendidly, bearing in rich profusion its elegant fruit. The apricot, pear and nectarine all do well here, while the grape, both wild and tame, is unexcelled, the vigorous and rapidly growing vines being thickly covered with large bunches of the luscious fruit, in an abundance only equaled by the great grape-growing country of California. All kinds of small fruit do well here, especially the wild blackberry, which grows in profusion and to a size equal to any of the eastern cultivated varieties.

STAPLE PRODUCTIONS.

The soil of Barton county will produce an abundance of wheat, oats, corn, rye, flax, barley, castor beans, millet and Hungarian, while all the tame grasses, such as timothy, blue grass, red top and clover will grow luxuriantly. For some years large amounts of flax and castor beans have been raised, for which a ready market can always be had. The leading productions are corn, oats and wheat.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn		8 bushels.
Cultivated in wheat		3 bushels.
Cultivated in oats		20 bushels.

Remarks.

County being settled so rapidly, it is hard to make estimate of crops; drouth unprecedented; vegetables of all kinds almost a failure; apples almost a failure; no rain for two months prior to 29th of August.

BATES COUNTY.

Population, 25,362. It is situated on the western border of Missouri, and is the third county south of the Missouri river on the Kansas line. It is bounded on the north by Cass county, on the east by Henry and St. Clair counties, on the south by Vernon county, and on the west by Linn county, Kansas. It is about thirty miles square, and its area is a little less than 900 square miles.

Grand river, a tributary of the Osage, forms a part of the northern boundary, and the Osage forms a part of the southern boundary. The Marais des Cygnes, a tributary of the latter stream, passing through the county from northwest to southeast, cutting off about one-fifth of the territory in the southwest corner.

SOIL AND PRODUCTS.

The county is mostly high, undulating prairie, with a small portion of low, flat land along some of the streams.

Beautiful mounds, varying in height from 100 to 200 feet, now and then relieve the monotony of the rolling prairie, and the low lands along the streams are, for the most part, covered with a heavy growth of valuable timber, consisting of ash, elm, oak, walnut, hickory, maple, mulberry and pecan, and many other varieties of less value.

A large portion of the land being unoccupied, offers special inducements to farmers wishing to raise stock; thousands of acres of "non-resident lands" affording sustenance for herds free of expense for eight or nine months in the year.

The soil being, for the most part, underlaid with limestone, cannot be surpassed in fertility by any county west of the Mississippi. It is well adapted to the growth of blue grass, timothy, clover and other tame grasses. From forty to seventy-five bushels of well matured corn is produced each year on every acre properly cultivated, and the aver-

age yield of wheat is from fifteen to thirty bushels per acre, and other small grain in proportion. Vegetables of all kinds are cultivated with success, and those who have tried it, say that tobacco of fine quality can be grown to advantage; but little or none is raised, on account of distance to market, there being no manufactory near.

RAILROADS.

The Missouri, Kansas and Texas is the only railroad at present passing through the county, and affords convenient transportation for the eastern and southeastern portion. But the people of this county manifest a spirit of enterprise in the way of building up the county and securing railroads that is praiseworthy. About $30,000 and the right of way has been given by the people of Bates county to the Lexington and Southern Railroad, a branch of the Missouri Pacific, commencing at Pleasant Hill and running south through the western tier of Missouri counties, and the road now is under contract and in process of construction, with a fair prospect of being completed to the southern border of the county by the 4th of July, 1880.

The Burlington and Southwestern Railroad also owns an old roadbed running north and south through the center of the county, which will be ironed and put in operation as soon as that road can extend its line to Kansas City.

The Missouri Central Railroad, now being constructed westward from Jefferson City, will probably pass through the county from east to west.

The wagon-roads of the county are naturally good and are generally kept in good condition.

Crop Reports.

1881.

Articles.	No. of Acres.	Yield per acre
Wheat harvested	14,260	5½ bushels.
Oats harvested	20,390	30 bushels.
Corn cultivated	138,240	10 bushels.
Flax cultivated	9,600	8½ bushels.

Remarks.

Wheat crop a partial failure, caused by too much rain in June. Corn injured by drouth and chinch bugs; fruit almost a total failure.

BENTON COUNTY.

Population, 12,398. It is situated in the southern tier of counties which form that portion of the State known as Central Missouri. It lies immediately south of Pettis county, and comprises 720 square miles.

WATER COURSES.

The Osage river, which is navigable a great portion of the year, runs centrally through the county from west to east, with the following tributaries, viz.: Grand river, Big and Little Tebo, Cole Camp and Buffalo creeks on the north, and Pomme de Terre, Hogles, Turkey, and Big and Little Deer creeks on the south side, each of which streams furnishes an abundance of water and water-power for all kinds of manufactures.

THE SOIL.

The greater portion of the county north of the Osage river is prairie of excellent quality, which is being settled up with a thrifty, energetic class of people from the Northern and Eastern States.

The southern portion of the county, with the exception of the river and creek bottoms, is generally hilly and broken. The soil of these bottoms is the finest farming lands in the west, and a large percentage of the hill and ridge lands are very productve. Unimproved lands can be purchased at from four to eight dollars per acre; improved farms at five to twenty dollars per acre. A large quantity of land is subject to pre-emption and to entry at Government price, one dollar and twenty-five cents per acre.

RAILROADS.

There is no railroad completed through the county yet, but track-laying is in progress on the Sedalia, Warsaw and Southern Railway, which will be completed and the cars running to Warsaw on or before the 1st day of July, 1880. The Osage Valley and Southern Kansas Railroad will be completed to Versailles, in Morgan county, in a few weeks, and will then be continued through Benton county.

BOLLINGER COUNTY.

Population, 11,132. It is situated in southeast Missouri, one hundred and twenty-five miles south of St. Louis, and thirty miles west of the Mississippi river. The St. Louis, Iron Mountain and Southern Railway runs directly through the center of the county, cutting it diagonally —entering at the northwest corner and leaving at the southeast; is bounded by Perry county on the north, Cape Girardeau on the east, Wayne and Madison on the west, Stoddard and a part of Wayne on the south. No county in the State is, perhaps, better watered than Bollinger. Water courses and springs of the purest water are innumerable. The country is truly romantic, and travelers have often said that scenes and landscapes here exist, which, upon canvas, would rival in beauty and scenic show, those of the Shenandoah, Hudson and Cheyenne. Educated agriculturists will some day make Bollinger county one of the fairest counties in the State. The principal streams, which afford clear, swift-running water all the year round, are Big and Little Whitewater, Castor river, Hurricane, Perkins' creek, Big and Little Crooked creeks, with others of less importance. The entire county is very finely watered, and building sites are numerous. Hard-by are never failing springs.

CHARACTER OF SOIL AND AGRICULTURAL ADVANTAGES.

In this county are found several kinds of soil—the black and mulatto alluvial, a grey, pipeish soil of a clayey character, and the yellow loam. Each of these soils are peculiarly adapted to certain kinds of cultivation, as well as products. The uplands are loose and loamy; they lie between the water courses, and in many instances are a second bottom or table land. These lands are highly suited to the raising of wheat; in fact, produce the very best of wheat, and compare favorably with the lands of Cape Girardeau and Perry counties, so famous for fine wheat growing.

It can be safely said that no county in Southeast Missouri has a finer and better variety of soil, and not one more susceptible of a diversified agricultural development. Some excel this in a particular way; as Cape Girardeau is a thorough wheat growing county, Mississippi is par excellent for corn, Dunklin for cotton, and so on; but for a

combination of agricultural advantages and diversities Bollinger is not easily surpassed. A specially large inheritance from nature is seldom versatile and attractive, and it is only when she modestly distributes her blessings that all are best provided for, as well as best pleased.

The sub-soil throughout the county is of a clayey nature, though along the creeks it is sometimes of a sandy character.

FRUITS.

Bollinger is especially adapted to fruit growing. Possessed of a mild climate, the winters are seldom of such severity as to destroy the entire crop. The ridges and uplands are preferable for fruit growing to the valleys and bottom lands, as being dryer and less influenced by the cold, damp moisture of spring, frost seldom interfering with an orchard when planted on high ground.

The principal varieties of fruit are apples, pears, peaches, plums, and cherries. The culture of apples, perhaps, commands the most attention, and is the most profitable.

PRICE OF LAND.

Lands can be bought for from one to fifteen dollars per acre. These lands are all adapted to some kind of agricultural use. Hundreds of acres are held in readiness for sale. Purchasers and those seeking homes can go nowhere with fairer hopes of obtaining what they want, with greater certainty, than in this county. The terms are easy in almost every instance. Taxes being so low, and no bonded indebtedness, no county or country can afford better inducements to immigrants than Bollinger.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	40,000	40 bushels.
Cultivated in wheat	20,000	15 bushels.
Cultivated in oats	10,000	35 bushels.
Cultivated in sorghum	4,000	100 gallons.
Cultivated in tobacco	500	1,000 lbs.
Cultivated in timothy and clover	5,400	1 ton.
Cultivate in vineyards	60	5,000 lbs.

1881.

Articles.	No. of acres.	Yield per acre
Cultivaten in corn	50,000	4 bushels.
Cultivated in wheat	24,000	4 bushels.
Cultivated in oats	7,000	30 bushels.

REMARKS.

Tobacco a failure; fruit about one-sixth an ordinary crop; drouth and chinch bugs.

BOONE COUNTY.

Population, 25,444. Boone county was settled in 1815, organized in 1820, and has an area of 673½ square miles—431,000 acres—and an enviable location. Situated in the very heart of the Missouri Valley and in the fairest and richest portion of Northeastern Missouri, with the Missouri river on its southern, and two great trunk railway lines upon its northern border, it combines the best commercial facilities with such advantages of climate; soil, topography, agricultural production and mineral resources as few districts in the great west can boast.

THE SOILS.

The Missouri bottoms (of which there are about fifty square miles) with the valleys along the minor streams, are alluvial from four to fifteen feet in depth, of inexhaustible fertility and admirably suited to wheat and corn, of which half a hundred successive crops are grown without a sign of diminution in yield. The "Elm Lands," of which there are at least twenty thousand acres chiefly along the divide between the Perche and Moniteau, have a chocolate colored soil from fifteen to thirty inches deep, of great richness and versatility, and produce splendid crops of everything grown in this latitude. The bluff or loess soils of the bluff districts embrace a prime fruit country.

It lies within the great fruit belt, and bears most of the staple fruits of the medium latitudes in perfection. It may very appropriately be called the new vineland. On the "elm lands," between the Perche and Moniteau, are to be found a wild grape vine twenty-nine inches in circumference at a point several feet above the ground. The native forests are everywhere festooned with wild grape vines of splendid growth, many of them evidently a century old. Domestic grapes of many varieties are grown in profusion at a cost of two cents per pound, and never fail of a bounteous crop. Peaches give a fine crop three years out of five. Pears do finely over strong clay subsoils. Several varieties of plumbs ond cherries secceed well on any of the above named soils.

Low price of lands is a surprise to eastern men who cannot understand why good lands here should not be worth as much as similar estates in Illinois, Indiana or Michigan. Improved farms are offered at eight to twenty-five dollars per acre, according to soil, location and improvements, the average being less than fifteen dollars, and the price asked being almost invariably less than the cost of the buildings, fences, orchards and other improvements. Wild lands range from one to ten dollars per acre, the figure generally depending upon soil, topography and location.

Columbia, the capital of Boone county, was settled in 1820, formally laid out and made the county seat in 1821, and now has a population of nearly 4,500. It has an enviable location near the center of the county, in the high rolling wood-lands of the Hinkson, and is beautifully located.

The University is the distinguishing feature of Columbia. It is on a secure basis, its permanent funds and total property being valued at upwards of $1,000,000, and its yearly revenue from all sources between $40,000 and $50,000.

The character of the University is substantially based upon the American plan and may be briefly summed up as follows: Two groups or departments, the Academic and Professional; each being a collection of schools, the Academic department being the center or nucleus around which the Professional schools cluster.

The Academic schools which are divided into two classes, viz.: Science and Language, cover substantially the usual course pursued in most first-class colleges.

The Professional Schools include agriculture, pedagogics, law, medicine, mining and metallurgy, engineering and art. A school of military science has recently been established and placed in charge of Lieut. Frank P. Blair, Jr., an accomplished officer of the United States army, detailed especially for military instruction.

To the honor of Missouri be it said that by act of its Legislature in 1872 the doors of the University were thrown open to women, thus giving recognition to the mental equality of the sexes and that other doctrine of all sound philosophy, co-education of the sexes. The number of students in attendance upon all departments including the School of Mining, reaches nearly six hundred. The University is fast growing in popular favor and influence, and it is not improbable that within the next two years the present facilities for both theoretical and practical instruction will have become inadequate to meet the rapidly growing demand for the higher education of the young men and women of Missouri. The yearly expense of schooling here, including matriculation, board, washing, fuel, lights and all incidentals, is only nominal as compared with eastern colleges. Under the popular club system the entire yearly expense need not exceed $110.

There are in addition to the facilities afforded by the University for the education of young women, Christian College which offers rare educational advantages to young ladies from abroad. It was founded by the Christian Church in 1850, and has ever since been in successful operation. Stephens College belongs to the Baptist denomination of the State, and is also a woman's college. It was founded in 1856 and has ever since been in successful operation. The buildings are of fine architecture, spacious and admirably suited to their purpose, and occupy elegant and ample grounds in a beautiful quarter of the town. About one hundred and eighty young ladies are attending the present session, sixty-five of whom are members of the college family.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	50,000	30 bushels.
Cultivated in wheat	40,000	20 bushels.
Cultivated in oats	8,000	20 bushels.
Cultivated in timothy and clover	50,000	1½ tons.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	60,000	8 bushels.
Cultivated in wheat	45,000	10 bushels.
Cultivated in oats	6,000	20 bushels.
Cultivated in timothy and clover	60,000	½ ton.

REMARKS.

Drouth lasted from the 3d of July till the 20th of September; chinch bugs worse than ever before in the history of the county.

BUCHANAN COUNTY.

Population, 49,824. This county is located in the northwestern part of the State, and is one of the six counties constituting what is known as the Platte Purchase, a strip of country taken from the Indian Territory and annexed to Missouri by an act of Congress passed in 1836. It is bounded on the north by Andrew county, east by DeKalb and Clinton, south by platte and west by the Missouri river, which separates it from the State of Kansas, and contains 272,329 acres. Its population was in 1840, 6,237; in 1850, 12,985; in 1860, 23,861, and in 1870 it was 35,109, of whom 33,156 were white, and 1,953 were colored; 19,175 were male, and 15,934 were female; 28,796 were born in the United States, and 6,313 were of foreign birth.

Agricultural products are corn, wheat, barley, rye, hemp, tobacco, hogs, and live stock. Grapes, apples, peaches and small fruit are raised extensively, and the grape and wine interest has grown into some importance in the past few years.

Mineral resources, so far as at present developed, consists of an abundant supply of building stone and brick clay with indications of coal.

RAILROADS.

An examination of any good map will give an idea of St. Joseph as a railroad center, and of the great railroad advantages enjoyed by Buchanan county. The Hannibal and St. Joseph Railroad extends from St. Joseph east through the center of the county, affording direct communication with Chicago by that route. The Wabash, St. Louis and Pacific Railway gives direct communication with St. Louis. The Atchison Branch of the Hannibal and St. Joseph Railroad runs through the western portion of the county from St. Joseph to Atchison, Kansas. The Kansas City, St. Joseph and Council Bluffs Railroad extends south to Kansas City and north to Council Bluffs. A branch of this road runs from St. Joseph by way of Hopkins into Iowa, thus affording another and competing route to Chicago. The Chicago, Rock Island and Pacific Railroad crosses the southern portion of the county. The St. Joseph and Denver Railroad extends west into Kansas, connecting with the Union Pacific at Grand Island in the State of Nebraska. The Atchison and Nebraska Railroad, with the Missouri Pacific, the Atchison, Topeka and Santa Fee Railroad, and the Central Branch of the Union Pacific at Atchison, have also direct communication with St. Joseph over the iron bridge across the Missouri at St. Joseph and Atchison. The St. Joseph and Des Moines Narrow Gauge Railroad now nearly completed forty miles to Albany, in Gentry county, and soon to be pushed forward to a connection with the Iowa system of roads, passes through a considerable portion of Buchanan county. These make St. Joseph and Buchanan county a great railroad point, and virtually the terminus of twelve railroads. Other roads are projected and will be in due time constructed.

EXPORTS.

The exports are mainly corn, wheat, tobacco, hemp, barley, rye, cattle and hogs.

WEALTH.

The valuation of the county, according to the census of 1870, was $20,000,000.

PRICE OF LAND.

Good farms can be purchased at from ten to thirty dollars per acre, according to locality and improvements.

BUTLER COUNTY.

Population, 6,011. Butler county is bounded on the north by Wayne county, on the east by St. Francois river, on the south by the Arkansas line, and on the west by Ripley county. It contains about 1,000 square miles.

Poplar Bluff, the county seat, is a thriving town of about 1,000 inhabitants, situated on the west bank of the Big Black river, and at the junction of the St. Louis, Iron Mountain and Southern and Cairo, Arkansas and Texas Railways.

The county is well watered, the St. Francois river, running from north to south, washing its entire eastern border. Big Black river passes through the center of the county from north to south, a distance of thirty-five miles. Besides these there are Little Black river, Cane creek, Ten Mile creek, Beaverdam, Indian creek, and numerous other smaller streams. Big Black river is navigable as far up as Poplar Bluff.

There is, perhaps, no country in the West surpassing this for its great variety and fine forests of timber. Pine, poplar, walnut, cherry, maple, ash, oak, hickory, gum, cypress, etc., grow in great abundance here.

The mineral resources are almost wholly undeveloped, but the prospects are favorable in many parts of the county for paying deposits of iron and perhaps other minerals.

CHARACTER OF LAND.

There are four grades of land found here: The low bottoms of the river and creeks, the second benches, the flat woods or barrens, and the hills. Under proper culture the various products common to this climate grow luxuriantly and yield bountiful crops.

The almost unlimited amount of wild land, covered with the richest grasses and furnished with the greatest abundance of water, makes this second to none as a stock growing country.

PRICE OF LAND.

Butler county owns 20,000 acres of land subject to entry at $1.25 per acre.

There is yet seme government land in the county. The St. Louis, Iron Mountain and Southern Railway Company own some very fine land in the county, which can be purchased at greatly reduced rates.

There is also some good land in the county belonging to the Agricultural College, which may be bought at from eighty cents to $2.50 per acre.

The number of miles of railroad in the county are: St. Louis, Iron Mountain and Southern, 35.31; Cairo Branch, 11.28, making a total of 46.59 miles, the road-bed and rolling stock of which are valued at $404,606.

CALDWELL COUNTY.

Population, 13,654. It lies near the center of the northwest quarter of the State, between Daviess on the north and Ray on the south, Livingston and Carrol on the east, and Clinton and DeKalb on the west. Extending eighteen miles north and south, and twenty-four east and west, it contains 432 square miles, or 276,480 acres.

SOIL CHARACTERISTICS.

The soil is generally of the very best quality, and may appropriately be divided into three classes: First, the high prairie; second, the calcareous or limestone; and third, the bottom.

The high prairie lies on the ridges between the water courses, and constitutes about two-thirds of the land of the county. The soil consists of a deep, dark siliceous loam, with an argillaceous subsoil sufficiently porous to admit of free drainage of surplus water.

The calcareous or limestone lies near or below the limestone ridges, which crop out on the hillsides along the water courses. The soil is not so deep as the high prairie, but is very fertile and rich in lime.

The bottom lies along the water courses. The soil is very deep, being composed of sand, clay and vegetable mould variously intertratified. It corresponds in quality to the great bottoms which lie along the Missouri and Mississippi rivers.

WATER AND TIMBER.

Shoal creek, the principal water course in the county, takes its rise in Clinton county, and flows in an easterly direction, passing near the center of the county, and forms a tributary of Grand river. Its principal tributaries on the north are Brushy Mill Tom, Cottonwood and Otter creeks. On the south are Mud, Crabapple, Log, Goose and Deer creeks. These, together with others of less note, are well distributed over the county. Their borders are fringed with a vigorous growth of soft maple-sugar trees, hackberry, wild cherry, ash, linden, shellbark and white hickory, burr oak, black walnut, sycamore, mulberry, black, red, white and laurel oak, plum, hazel, sumac, wahoo, prickley ash, crabapple and many other trees of this latitude. These streams being deep set, principally below the limestone ledges, furnish an abundant supply of water for stock. The timber yields a refreshing shade in summer and a protection from the storms in winter, as well as a bountiful supply for fuel and building purposes.

PRODUCTIONS.

The productions of Caldwell county are as varied as her soil is rich and fertile. Corn, wheat, oats, rye, sorghum, buckwheat, potatoes, flax, hemp, blue grass, timothy, clover, millet, Hungarian, and in fact every plant grown within the climatic zone of Missouri gives an abundant yield here. Corn is the most extensively cultivated. This, the king of all the cereals, grows from eight to fifteen feet high, and yields from twenty-five to seventy-five bushels per acre. It grows well on all the soils enumerated, but the high prairie and bottom lands are its native home, and on these it gives its greatest yield. Oats yields from twenty-five to sixty bushels per acre, and wheat from ten to forty.

RAILROADS.

Through the northern tier of townships runs the old reliable Hannibal and St. Joseph Railroad, which brings the people in reach of the markets of the world.

There is also a prospective railroad to run from Kansas City to Chillicothe by way of Kingston, the county seat. This, if built, will be of great benefit to the people.

PRICE OF LANDS, ETC.

This land, with all its advantages, can be bought cheap. Unimproved land is offered at from five to ten dollars per acre. Improv-

arms can be bought at ten to twenty-five dollars per acre, depending n the improvements and other advantages.

Crop Report.

1881.

Articles.	No. of acres.	Yield per acre
ultivated in corn	50,000	10 bushels.
ultivated in wheat	20,000	10 bushels.
ultivated in oats	10,000	40 bushels.

Remarks.

Suffered from drouth and chinch bugs.

CALLAWAY COUNTY.

Population, 23,670. This county was organized in 1820, has an rea of 809 square miles—517,760 acres—lies in what is commonly alled Northeastern Missouri, about fifty miles directly west of the lississippi river, and eighty miles west of St. Louis, and is bounded on he north by Audrain county, on the east by Montgomery county, on he south by the Missouri river, and on the west by Boone county.

TOPOGRAPHICAL FEATURES.

Twenty-five per cent. of the county is high, rolling prairie, mostly lying in the northern division of the county, and interspersed with pretty belts of timber that fringe the smaller water courses flowing southward from the high divide or water-shed between the Missouri and Mississippi rivers. Smaller prairies, glades and intervals are found in the central portions, but the solid south half, with most of the central division of the county, is high, rolling timbered land, coursed by valleys and their attendant streams dipping southward to the Missouri river. The Missouri river bottoms, varying from one to three miles in

width, extend, with little intermission, along the entire southern borde of the county, and embraces half a dozen of the finest valley views i the Southwest. The bluff district, which extends inland four and fiv miles from the river and bottoms, is a range of somewhat irregul wooded hills, generally easy of access and suited to agriculture.

TIMBER SUPPLY.

A dozen varieties of oak, plenty of ash and elm, and extensiv groves of walnut, with hickory, hackberry, sycamore, white birch, har and soft maple, cottonwood, cherry, linden, and a dozen other varieti furnish cheap fuel to repletion, and valuable commercial woods f manufacture or export on a large scale.

LOW PRICE OF LANDS.

Everywhere lands are selling far below their intrinsic value. The is no end of offerings in good improved farms at less than the value their improvements in buildings, fences and orchards. The range prices for farms, runs all the way from eight to twenty-five dollars p acre, the medium being from twelve to sixteen dollars per acre. Wi lands are offered at from one dollar and fifty cents to ten dollars p acre, depending upon soil and location. The transportation facilitie are excellent. The Jefferson City Division of the Chicago and Alto Railroad crosses the county from north to south, giving connection with the main line and the Wabash, St. Louis and Pacific at Mexic and the Capital of the State, the Missouri Pacific Road and the Missou river on the south, giving the county forty-one and one-half miles railway and ten shipping stations. The Missouri river furnishes chea and ample transportation the greater portion of the year. Just acro the river from the southern border of the county, the Missouri Pacif Road furnishes competition with the river boats at seven shipping sta tions. The Wabash, St. Louis and Pacific Railway furnishes half dozen near shipping points for the northern portion of the county.

EDUCATIONAL FACILITIES.

No county in the State of Missouri surpasses Callaway for schools There are in the county one hundred and fifteen white and fifteen col- ored free public schools—all in a flourishing condition. These school accommodate 8,000 children, at the low rate of taxation of thirty-three cents on the one hundred dollars.

The county has a standing county school fund of over $45,000, and a annual sum arising from the State fund of about $6,000. New hool houses abound in nearly every school district, and nearly $30,000 e expended every year for school purposes. Besides, there are two lleges—male and female—located at Fulton, the county seat. These lleges are thorough in the work of giving a knowledge of the higher anches of education.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre
tivated in corn	50,000	30 bushels.
tivated in wheat	20,000	20 bushels.
tivated in oats	25,000	35 bushels.
tivated in sorghum	500	
tivated in tobacco	2,500	700 pounds.
tivated in timothy and clover	30,000	1½ tons.
tivated in vineyards	500	

1881.

Articles.	No. of acres.	Yield per acre
tivated in corn	93,300	5 bushels.
tivated in wheat	90,000	10 bushels.
tivated in oats	9,380	20 bushels.
tivated in tobacco	8,000	A failure.
tivated in timothy and clover	12,200	1 ton.

CAMDEN COUNTY.

Population, 7,267. Camden county is located near the center of the State of Missouri, 150 miles west of the city of St. Louis, and about fifty miles southwest of the Capital of the State. It has an area of 720 square miles. Linn Creek, the county seat, is situated near the center of the county, and one mile south of the Osage river in the valley of Linn creek, from which creek its name is derived.

TOPOGRAPHY.

The eastern portion of the county is generally rolling, but interspersed with beautiful fertile valleys. The western and northwestern portions are rough and mountainous, with large fertile valleys between the mountain ranges and along the rivers and creeks.

The entire surface is covered with fine timber, except what is in cultivation. There is an abundance of good building stone. Limestone abounds in every part of the county, from which lime of the best quality is made.

SOILS AND PRODUCTS.

Every variety of soil is found in the county, from the rich alluvial soil of the river bottoms to the mulatto clay of the uplands. It is equally well adapted to grain, grass, fruits, stock-growing and grazing. The products of the forests furnish feed for hogs, and the wild grass on the hills and mountains pasturage for sheep and cattle, which can be raised with little expense. The bottom and valley lands are as rich and productive as any in the State, and the uplands produce small grain, grass and fruits in abundance, especially the grape, which has proved a success wherever it has been tried. The wild grapes grow spontaneously on the hill and mountain sides, from which hundreds of gallons of wine have been made.

RAILROADS.

The St. Louis and San Francisco Railroad passes through the southeast corner and along the southern line of the county. This company has 3,338 acres of land in the county, and Stoutland, in this county, a station on this road, is quite a flourishing shipping point.

A preliminary survey is now being made through the county for n extension of a branch of the Osage Valley and Southern Kansas ailroad, from Versailles, in Morgan county, to Lebanon, in Laclede ounty, which will pass through the center of the county, connecting t with the two trunk lines running east and west, and giving competition between two railroads and river transportation.

Crop Reports.

1879.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	70,000	40 bushels.
Cultivated in wheat	40,000	11½ bushels.
Cultivated in oats	20,000	26 bushels.
Cultivated in sorghum	8,000	
Cultivated in tobacco	1,000	
Cultivated in timothy and clover	26,000	2 tons.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	70,000	40 bushels.
Cultivated in wheat	45,000	15 bushels.
Cultivated in oats	20,000	25 bushels.
Cultivated in sorghum	8,000	
Cultivated in tobacco	1,000	
Cultivated in timothy and clover	27,000	2 tons.

CAPE GIRARDEAU COUNTY.

Population, 20,998. Cape Girardeau county, the largest, most populous and by far the wealthiest county in Southeast Missouri, is

situated on the Mississippi, one hundred and fifty miles south of the great city of St. Louis.

Perry county bounds it on the north, Bollinger on the west and Scott and Stoddard on the south.

CHARACTER OF THE LAND.

The surface of the land is varied and uneven; in some parts hilly; but the greater portion lies in excellent position for cultivation.

The traveler who passes up and down the Mississippi river, or the St. Louis, Iron Mountain & Southern Railway, is very liable to take up an erroneous idea of the true condition and character of the surface and soil of the county. If he is on the river he sees a chain of hills that soon give way to a rich, rolling surface, not visible except at places where creeks empty into the river. If he is on the railroad he will likely think, from what little he can then see, that this county belongs to what is known as the "Swamp of Southeast Missouri." This is a mistake. Cape Girardeau county has but little swamp land; in fact, every acre of it can be seen from the railroad. The great body of the county belongs to that grade denominated as uplands, and in many places where the larger farms join each other the sight resembles the rich, rolling prairies of the West. There is, however, along some portions of the Mississippi river, Whitewater river and the creeks, broad acres of bottom lands.

RESOURCES, PRICE OF LAND AND VALUATION.

The agricultural resources of the county are not surpassed by a like number of acres in the world, and the immense crops which are produced year after year from the same lands are a verification of this statement. There is in the county five hundred and ninety-eight square miles, or 382,720 acres, of which about one-fourth is in a high state of cultivation. There is, perhaps, of this 382,720 acres, fully one-fourth, for sale. In other words, there is now on the market 95,680 acres of land in this county.

The unimproved lands can be had at from two to ten dollars per acre; the improved at from five to thirty dollars per acre, owing to location, improvements, etc. These are the extreme figures, as will be seen from an examination of the public records.

The assessed valuation of the county (which is not more than one-fourth of the true valuation), for the year 1879, was $4,003,825.

TRANSPORTATION FACILITIES.

The highways of the county with the outer world are the Mississippi river and the St. Louis, Iron Mountain and Southern Railway. The former bounds the county on the east and the latter passes through the southwest corner of the county. There is a strong probability that a branch road will be built from Allenville, a station on the St. Louis, Iron Mountain and Southern Railway, to Jackson, the county seat of Cape Girardeau county, as the survey has already been made. It is also more than likely that work will soon be resumed on the Cape Girardeau and State Line Railroad. In addition to these great highways there are three macadamized roads in the county leading in various directions to the adjoining counties. These last are private corporations—individual enterprise—upon which a small toll is collected for the purpose of keeping up the corporations.

CROP REPORTS.

1880.

Articles.	No. of acres.	Yield per acre.
ultivated in corn	50,000	35 bushels.
ultivated in wheat	60,000	15 bushels.
ultivated in oats	10,000	20 bushels.
ultivated in sorghum	400	200 gallons.
ultivated in timothy and clover	3,000	2 tons and 2 bu. seed.

1881.

Articles.	No. of acres.	Yield per acre.
ultivated in corn	100,000	15 bushels.
ultivated in wheat	150,000	7 bushels.
ultivated in oats	50,000	25 bushels.

CARROLL COUNTY.

Population, 23,262. The area of Carroll county comprises about 440,000 acres of land, three-fourths of which is now in cultivation; and not more than one-fifteenth of the county is what might be called poor land—even in Missouri, where all land is good—and has a population of about 22,000.

SOIL.

The soil of Carroll county is unsurpassed in fertility, and corn, wheat, oats, tobacco, hemp, flax, potatoes and fruit of all kinds are sure a crop there as in any other part of the temperate zone.

TIMBER AND PRICE OF LANDS.

A fair proportion of the county is timber of good quality.

The price of improved lands is from ten to thirty dollars per acre according to the value of improvements, and there is plenty of good land that can be bought at these figures.

The Wabash, St. Louis and Pacific Railway runs through the county from east to west.

The farmers and citizens of Carroll county are progressive, public spirited, energetic in improvements, law-abiding, intelligent, church going and education-loving people.

SCHOOLS.

There are in the county one hundred and thirty school houses, mostly new and commodious buildings, and about fifty churches, the Baptist Church at Carrollton costing $18,000.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre.
Cultivated in corn	150,000	40 bushels.
Cultivated in wheat	30,000	15 bushels.
Cultivated in oats	15,000	30 bushels.
Cultivated in hemp	100	800 pounds.
Cultivated in flax	2,000	8 bushels.
Cultivated in tobacco	1,000	1,000 pounds.
Cultivated in timothy and clover	150,000	1½ tons.
Cultivated in vineyards	30	.....

1881.

Articles.	No. of acres.	Yield per acre.
Cultivated in corn	160,000	21 bushels.
Cultivated in wheat	28,000	12 bushels.
Cultivated in oats	16,000	35 bushels.
Cultivated in flax	5,000	5 bushels.
Cultivated in timothy and clover	151,000	1½ tons.

CARTER COUNTY.

Population, 2,168. It is bounded on the north by Sherman and Reynolds counties, and on the east by Wayne and Butler counties, on the west by Shannon and Oregon counties, and on the south by Ripley and Oregon counties.

ACREAGE AND ASSESSMENT.

The county contains 303,977.33 acres, the assessed valuation of which is placed at $422,337.

WATER COURSES.

The water courses supplying irrigation are Current river, Rogers' creek, Mill creek, Home creek, Pike creek, Chilton creek, Barren creek, Henpeck creek, Ten Mile creek and Little Black river.

FORESTS.

An abundance of the best timber is found in the forests of Carter county, classed as follows: Pine, and the varieties of oak, hickory, ash, walnut, maple, elm, gum, locust, hackberry, persimmon and sassafras.

MINERALS.

The mineral resources consist of iron, lead and copper, and small quantities of zinc, but so far no mines have been developed.

PRODUCTIONS.

The soil is well adapted to the cultivation of corn, wheat, oats, rye, barley, potatoes, turnips; tobacco and cotton are raised on a small scale for home consumption. All kinds of vegetables do well, and the watermelon and muskmelon crop is very fine. Sorghum is cultivated by nearly all farmers.

Strawberries, raspberries, blackberries and whortleberries grow wild in profusion. Wild grapes are found on every hillside, and grape culture would undoubtedly prove profitable.

FRUIT CULTURE AND CLIMATE.

Apples bear well, and peaches miss two years out of three. The climate is mild but variable, and there is seldom much snow.

CASS COUNTY.

Population, 22,431. This county has an average width of twenty-six by twenty-seven miles, having about 450,000 acres of land within its borders; it is situated upon the western border of the State, and is within the lines of thirty-seven and one-half degrees north latitude, being nearly on a line with the cities of St. Louis, Cincinnati and Washington, and with an elevation of about 1,000 feet above the level of the sea. From its position geographically, its condition as to climate will be readily inferred, that it is free from the extremes of heat and cold that characterize the Northern and Southern States of the Union. The surface of the country is generally gently rolling, having but few precipitous bluffs, consequently nearly all of it is susceptible of cultivation; so emphatically true is this that it has been frequently remarked by those most conversant with the surface condition of the country, that it would be difficult to find a quarter-section of land within its limits upon which a reasonably good farm could not be made.

CHARACTER OF LAND AND TIMBER SUPPLY.

The truth will be closely approximated by saying that three-fourths of its surface is prairie, the remainder timber, the timber lands producing the varieties usually found in the Middle and Western States, consisting of the different kinds of oak, hickory, elm, maple, honey locust, coffee bean and black walnut. Although immigrants from the heavily timbered States formerly supposed the supply of timber insufficient, the introduction of the Osage orange for hedging purposes, which in this climate and soil, with proper attention universally makes a cheap, beautiful and efficient fence, has entirely reversed public opinion as to the adequacy of the timber supply, the amount being now regarded as more than sufficient for the demands of the county in the way of fuel, fencing and building material. A large amount of walnut timber is now being exported from the county.

THE SOIL AND PRODUCTIONS.

The soil of the county is very fertile, and produces excellent crops. The corn crop for the past thirteen years, when planted in proper sea-

son and properly cultivated, has produced from forty to seventy-five bushels per acre. The wheat crop for the past five years, where the land has been properly prepared and sown early, has probably been between eighteen and twenty bushels per acre. Oats, flax, castor beans, tobacco, timothy, blue grass, clover and millet are successfully grown here. In no part of the United States is clover less damaged by severity of drouth and winter freezing than here. There are many fields in the county upon which clover was sown ten years ago, and not since resown, upon which there is to-day a perfect stand of clover, a fortunate circumstance in clover culture that seldom prevails in the clayey soils of the Eastern States. The most valuable features in the soil of this county are not fully embodied in the statements as to its fertility, but in its qualities in the way of durability; in its capacity to produce a long succession of good crops without the application of fertilizers.

PRICE OF LAND.

As great inducements in regard to the price of land in many other portions of the State cannot be offered, and this is wholly owing to the fact of a more fertile soil and of greater natural advantages. Owing, however, to the fact that many of the immigrants to the State invested in land beyond their means, there is at this time a large amount of private indebtedness, making necessary in very many cases the sale of landed property. This state of affairs is causing land to sell for much less than its intrinsic value.

CEDAR COUNTY.

Population, 10,757. Cedar county is in the second tier of counties east of the Kansas line, and the fourth north of the Arkansas line; has an area of about 489 square miles, or 319,050 acres of land. It was organized into a county on the 14th day of February, 1845, and there are a number of persons in the county now who have lived in the counties of Polk, Dade and Cedar, and all on the same farm with-

out moving. The county seat was located where it now is, and was first called Lancaster, afterwards changed to Freemont, and afterwards to Stockton.

The eastern half of the county is a timbered country, with only a few small prairies; the western is mostly prairie, with belts of timber along the streams, and beautiful groves on the high lands, in the distance resembling orchards more than groves of forest trees.

The soil is of three classes, known here as the white ask, black loam, and red clay or mulatto lands, all of which produce well in favorable seasons; but the two latter are best for all seasons and crops, and yield abundant crops of grass, tobacco, wheat, oats, corn, rye, millet, sorghum, flax, castor beans. The red land is peculiarly adapted to the growth of small grain, especially wheat and rye, and retains its fertility for fifteen, twenty or thirty years of successive cultivation, with very little, if any, decrease in the yield, and without the use of any kind of fertilizer.

CROPS AND CAPACITY OF THE LAND.

Wheat yields from ten to thirty bushels to the acre, but the farmer may safely count on an average of ten to twenty bushels, and the crop has never been a failure within the memory of the oldest inhabitant.

Rye succeeds well, but has been but little cultivated until within the last three or four years. It is now attracting the attention of farmers, who consider one crop of it almost equal to two ordinary crops of other grain, as it furnishes excellent pasturage for stock during the winter and spring months, produces a large yield of grain in harvest, and is perhaps the most certain crop produced in the country.

Oats generally yield large crops and are extensively cultivated.

Corn succeeds well, and is the staple crop of the country.

PRICE OF LAND.

Wild land can be had for from two to eight dollars, and improved land from four to twenty dollars per acre, according to locality, quality and improvements, and much of the wild land can be purchased on long time and easy terms.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	150,000	40 bushels.
Cultivated in wheat	6,750	15 bushels.
Cultivated in oats	6,750	40 bushels.
Cultivated in flax	300	12 bushels.
Cultivated in sorghum	100	100 gallons.
Cultivated in tobacco	100	1,000 pounds.
Cultivated in timothy and clover	1,000	2 tons.
Cultivated in vineyards	20	

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	145,000	5 bushels.
Cultivated in wheat	7,000	7 bushels.
Cultivated in oats	7,000	20 bushels.
Cultivated in tobacco	100	250 pounds.

Remarks.

Apples almost a failure; chinch bugs and drouth have been extremely severe.

CHARITON COUNTY.

Population, 25,224. Chariton county is situated on the north side of the Missouri river, and in the central part of that section of the State known as North Missouri. It is one of the oldest counties in the

State, having been organized on the 16th of November, 1820. It is bounded on the east by Randolph and Howard counties, on the north by Linn county, on the west by Livingston and Carroll counties, and on the south by Saline county, the Missouri river forming the boundary line between Chariton and Saline. It contains an area of 749 square miles, and is, therefore, one of the largest counties in North Missouri.

SOIL AND AGRICULTURE.

Although there are many evidences of lattent mineral wealth underlying various sections of the county, yet that interest, whatever it may be, is in a manner untouched, much less developed, and is uncared for at present. The great boast and pride of Chariton county consists chiefly in her unsurpassed wealth in soil and agriculture. The uplands, as well as the valleys along the numerous streams in the county, are marvelously rich and productive, and whenever cultivated produce most wonderful crops of cereals and grasses. The northern portion of the county is mostly high, rolling prairie, interspersed with tracts of forest lands, especially along the water courses. The southern portion of the county is extensively timbered with oak, hickory, elm, maple, black walnut, mulberry, ash, linn, sycamore, box elder, pawpaw, persimmon, pecan, hackberry, and wild cherry. To those familiar with the nature of such trees, the excellent character of the soil and climate is at once apparent.

TRANSPORTATION FACILITIES.

There are sixty-seven miles of railroad in the county, embracing a portion of the main line and two branches of the Wabash, St. Louis and Pacific Railway. The main line, running from St. Louis to Kansas City, crosses the county from east to west a little south of the center, twenty-eight miles of the road being in the county. A branch of the same road runs from Salisbury, in the center of the eastern portion of the county, to Glasgow, on the Missouri river, passing through the southern part of the county a distance of sixteen miles. Another branch of the road runs from Brunswick, also on the Missouri river, to Omaha, Nebraska, crossing the Hannibal and St. Joe Railroad at Chillicothe, thirty-nine miles from Brunswick, twenty-four miles of which are in Chariton county, and passes up the Grand River Valley in a northwestern direction.

In addition to the many advantages and facilities furnished by these roads running through the county, the Hannibal and St. Joe

Railroad, located just over the line in Linn county, and extending along the entire length of the northern boundary line of Chariton, furnishes the citizens in that portion of the county convenient transportation for all their surplus stock and produce. While those in the southern portion of the county have choice between competing railroad lines and the Missouri river which flows along the southern boundary of the county for a distance of forty miles, thus affording water transportation to all great commercial marts at the lowest rates.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	163,000	40 bushels.
Cultivated in wheat	60,000	15 bushels.
Cultivated in oats	22,000	30 bushels.
Cultivated in sorghum	1,200	
Cultivated in tobacco	5,000	800 pounds.
Cultivated in timothy and clover	22,000	1 ton.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	90,000	25 bushels.
Cultivated in wheat	70,000	10 bushels.
Cultivated in oats	40,000	35 bushels.
Cultivated in tobacco	2,500	500 pounds.

Remarks.

Wheat, largely winter, killed; damaged also by drouth and chinch bugs; corn crop short from the same cause.

CHRISTIAN COUNTY.

Population, 9,649. Christian county occupies a central position in what is known as Southwest Missouri, bounded on the north by Greene and Webster, on the east by Douglas, south by Stone and Taney, and on the west by Stone and Lawrence counties, and embraces an area of 561 square miles. Situated near the summit but on the southern slope of the Ozark range, having, perhaps, an average elevation of ten thousand feet above the ocean. The land is generally level enough for agricultural purposes, but undulating and well drained, the valleys of the numerous small streams being but little depressed below the common level. But in the southern and eastern portion of the county some of the streams cut quite deep, and the hills are abrupt and rise to a height of three hundred feet above the valleys.

TIMBER.

The bottoms of nearly all the streams have a heavy growth of the useful varieties of timber, such as burr oak, white oak, red oak, maple, walnut, wild cherry, etc. The slopes near the streams are also generally well timbered, but the flat and rolling lands, especially west of Finley, have at no very distant day in the past been prairie lands, but now have a growth of fine young hickory, black-jack, plum and crab-apple, with an undergrowth of hazel and sumac. The growth indicates the character of the soil of these uplands, which is equal to the best prairie lands. In the eastern part of the county hills and valleys alike are well timbered. On the hills are level lands of considerable extent, generally unoccupied, known as the Post Oak, Black Oak and White Oak Flats.

CROPS.

The farmers have good reason to be satisfied with the result of their labors the past season. The wheat yield was not large, but the quality was very fine. The best wheat lands, when properly cultivated, yield from twenty to thirty bushels per acre. Corn, an average crop—fifty bushels per acre is considered a good yield. Oats were injured by the dry weather in the early part of the season. Hay cut short by dry weather in the spring. Cotton, but little planted, the yield was very satisfactory. Potatoes, the yield was very good—both Irish and sweet do well. Vegetables, the yield was bountiful.

FRUIT.

Apples, a light crop; peaches, almost a failure; cherries, a light crop; strawberries, raspberries, etc., an average crop. Universally late frosts in the spring injured the fruit.

CROP REPORTS.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn		40 bushels
Cultivated in wheat		15 bushels
Cultivated in oats		40 bushels

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	30,009	15 bushels
Cultivated in wheat	40,000	10 bushels
Cultivated in oats	4,000	25 bushels

REMARKS.

Crops badly damaged by fly and douth.

CLARK COUNTY.

Population, 15,031. This county is located in the extreme northeast, touching the boundary lines of Iowa and Illinois, and is separated from Iowa on the north by the Des Moines river, and from Illinois on the east by the Father of Waters. The surface land is principally composed of undulating prairie. The portions near the creeks and rivers

re broken and hilly, except in that part bordering on the Mississippi. he streams are skirted with a heavy growth of walnut, butternut, ickory, sycamore, oak, ash, elm, honey locust, cottonwood, and all ther varieties indigenous to North Missouri. The greater portion of ie soil is a rich, pliable loam; on the bottoms it is a rich, sandy loam. here are 325,238 acres of land in Clark county—216,826 being prairie nd, and the remainder, 108,412, timber. Between the Des Moines nd Fox rivers lies a boby of 12,000 acres of bottom land, protected by vees. This is the finest character of corn land in the State.

RIVERS AND SPRINGS.

The county is watered by the Mississippi, Des Moines, Fox, Fabius Fyaconda rivers. Honey, Bear and Sugar creeks also traverse it and re tributary to the Mississippi. The most of these streams afford a ater-power that might be utilized to advantage. Factories of the rgest class can be, and are run upon the Des Moines. Springs are umerous, and excellent water can be obtained in all parts of the county t depths ranging from ten to forty feet.

AGRICULTURAL PRODUCTS.

The staples are corn, oats, rye, timothy, wheat, potatoes and blue rass. Beans, buckwheat and barley are cultivated to a considerable xtent. Clover and timothy are the pasture grasses. Clover is taking strong hold in every part not tilled. Considerable attention is paid cattle feeding, and the location and transportation facilities afford he benefit of both Chicago and St. Louis markets. The county is well dapted to fruit-growing, especially apples, peaches, pears, cherries and rapes. All improved farms have orchards. Many farmers are turning heir attention to wool-growing, and find it a most profitable investment.

RAILROADS.

The Missouri, Iowa and Nebraska Railway passes from east to west cross the county, having within its borders twenty-eight miles of track. The Keokuk and Kahoka Railroad has twenty-five miles of road-bed partially completed. The Keokuk and Des Moines Railroad (branch of the Chicago, Rock Island and Pacific Railroad) has twenty-five miles of track immediately adjacent to the nothern boundary. The Burlington and Southwestern Railroad passes within one mile of the northeastern boundary.

Price of land varies, according to improvement, from five to fifty dollars per acre.

CLAY COUNTY.

Population, 15,579. Clay county is bounded on the south by Jackson county, the Missouri river passing between. A bridge and splendid steam ferry connects it with Kansas City, which is a well known city, belonging almost as much to Clay county as to Jackson county, in which it is located.

RAILROAD FACILITIES.

Three railroads pass through the county leading to Kansas City, viz.: The Hannibal and St. Joseph, the Wabash, St. Louis and Pacific and the Kansas City, St. Joseph and Council Bluffs. The Chicago, Rock Island and Pacific also runs trains into Kansas City. Other surveys, are now being made, one by the Chicago, Burlington and Quincy, who claim that they mean to build. The county is well supplied with railroads.

The surface soil in the larger portion of the county is a rich alluvium from one to fifteen feet deep, and will produce corn, hemp, wheat and all the standard crops equal to the best lands in Kentucky and Illinois.

Underlying the entire uplands of the county is the famous loess subsoil, running down to the bed-rock or water level. This is so porous that, by capillary attraction, it will support vegetation in severe drouths, while it at the same time furnishes admirable drainage.

CROP REPORTS.

1881.

Articles.	No. of acres.	Yield per acre
Wheat harvested	15,000	4 bushels.
Oats harvested	1,000	15 bushels.
Corn cultivated	80,000	20 bushels.
Hemp cultivated	500	
Tobacco cultivated	1,000	
Apples cultivated	3,000	5 bushels.

REMARKS.

Drouth worse than since 1854; chinch bugs never so bad.

CLINTON COUNTY.

Population, 3,775. Clinton county claims the distinction of being the sightliest and richest county in Northwest Missouri. It lies upon the headwaters of Smith's Fork of the Platte, Castle, Lost Creek, Shoal and Fishing rivers, each running in different directions, thus leaving the main body of the county upon the high, broad ridges of these interlacing streams. It is in the center of that great bend of the Missouri, which commences at St. Joseph and ends at Lexington, lying about the same distance from the river on the west as on the south, and being sufficiently far from it to exempt its citizens from any detriment to health from overflow or malaria, and sufficiently near to get the benefit of the rains and dews generated by its flow. It embraces an area of twenty by twenty-one miles, its 420 square miles aggregating 269,000 acres, 200,000 of which lie within the broad prairie ridges, leaving the balance covered by timber. The prairie land is unexcelled in richness and depth of soil, producing in great profusion everything natural to this latitude, while the timber lands, when cleared, rival the famous blue grass region of Kentucky in the growth of that remarkable grass.

RAILROAD FACILITIES.

The 101 miles of railroad within the county, embrace the Hannibal and St. Joseph, running along the northern edge; the Kansas City Branch, running through the middle of the eastern half of the county; the Chicrgo, Rock Island and Pacific, running from the northeast corner through the county seat to the southwest corner, and the Wabash, St. Louis and Pacific, running from the southeast, comes through the northwest portion to St. Joseph, which with the contemplated branch of the Chicago, Rock Island and Pacific, from the county seat to Kansas City, places the county in the very foremost rank, and leaves every farmer in the county within six miles of a depot, from which he can reach any market, and through the competition of the various roads gives him the benefit of the very lowest rates.

THE LAND.

Land in Clinton county can be bought from fifteen to forty dollars per acre. There are many farms that should be subdivided, and, like all other counties, many farms for sale.

Crop Reports.

1881.

Articles.	No. of acres.	Yield per ac
Wheat harvested	40,000	5 bushels
Oats harvested	60,000	40 bushels
Corn cultivated	100,000	30 bushels
Flax cultivated	50	10 bushels
Tobacco cultivated	100	800 pounds
Apples cultivated	2,500	50 bushels

Remarks.

Wheat only one-third of a crop; corn, half crop, owing to drou and chinch bugs; oats and hay good.

COLE COUNTY.

Population, 15,519. Cole county, in position, is the pivotal county of the State. Geographically it is as near the center of the State as may be, and its capital town, Jefferson City, is the Capital of the State and its political center.

Its area, in round numbers, is 240,000 acres. In geographical position, it is, with reference to its boundaries, almost an equilateral triangle, its apex being formed on the east by the junction of the Missouri and the Osage rivers, the former forming its northwestern boundary for a distance of thirty miles, and the latter its southeastern boundary for nearly the same distance, thus enabling the county to enumerate among its commercial abvantages, a navigable river line of about sixty miles.

The greater portion of its surface is hilly, but it is traversed with numerous valleys of exhaustless fertility, through which course streams of living water, so that every part of the county is well watered, and no tract of farming land is without a copious supply of this all-important element of prosperity.

Dividing the county into halves, on the north and south, is the Moreau, a rivulet of moderate proportion, that traverses a wonderfully charming and picturesque valley, and empties into the Missouri four miles above the mouth of the Osage. Tributary to this stream are numerous other small streams, notably Honey creek, into which stretch other remarkably beautiful valleys, all of great fertility and productiveness. Then there are countless tributaries of the Missouri and the Osage, all coursing through valleys of transcendent beauty and adaptation to the wants of husbandry.

AGRICULTURAL RESOURCES.

The area of the county is 240,000 acres, of which 60,000 are in cultivation, leaving 180,000 acres not in cultivation. The average number of acres to the farm in cultivation is sixty.

The products of the 60,000 acres in cultivation is about as follows:

Of wheat, 30,000 acres, 450,000 bushels, value	$490,000
Of oats, 12,000 acres, 350,000 bushels, value	106,000
Of corn, 12,000 acres, 480,000 bushels, value	144,000
Of meadow, 8,000 acres, 16,000 tons, value	160,000
Total production in value	$900,000

Or an average production of fifteen dollars per acre cultivated.

TIMBER RESOURCES.

Covering these hilly slopes and intervening valleys is a dense growth of the timbers that enter largely into use for manufacturing purposes—oak, ash, elm, hickory, walnut, sycamore, and cottonwood—though, strange as it may seem, the "tie trade" is the only industry to which the native timbers of the county are tributary. In railroad ties a large business is done. It is not an exaggeration to say that the yearly product of the timber lands of Cole county in ties that go to

build the great roads of Kansas, Nebraska, Iowa and Colorado, is no less than $100,000 in value. That a great industry might be built up it the lumbering of timbers suitable for manufacturing purposes of ever description, in which the county abounds, is capable of easy demonstra tion. There are not a half-dozen saw mills in operation in the county but lumbering is, to some extent, an industry of the county. It is a industry, however, that might be greatly extended, and seems to b awaiting the hand of the industrious immigrant to give it a "boom."

CROP REPORTS.

1881.

Articles.	No. of acres.	Yield per ac
Wheat harvested	35,000	12 bushels
Oats harvested	1,000	15 bushels
Corn cultivated	3,000	5 bushels
Tobacco cultivated	200	

COOPER COUNTY.

Population, 21,638. Cooper is one of the central counties of th State, situated on the south side of the Missouri river, which forms i northern boundary line. It is bounded on the west by Saline and Pett counties, on the south by Morgan and Moniteau, and on the east b Moniteau.

SURFACE CHARACTERISTICS—SOIL AND TIMBER.

It has an area of 355,172 acres, which is about equally divided be tween prairie and timbered lands, while these may be subdivided int bottom lands and uplands. The southern and central portions of th county are composed chiefly of prairie, and the eastern, western an northern of timber land. Comparatively a very small portion of th

lands are unsuitable for agricultural purposes, and that is far more valuable on account of the rich deposits of minerals which underlie it. The character of the soil, of course, varies, according as it is timbered or prairie, lowland or upland, but it is all exceedingly fertile and productive, as is well attested by its natural timber productions, which in the uplands are hackberry, elm, wild cherry, honey locust, coffee tree, pignut, hickory, chestnut, burr oak, black and white walnut, mulberry, pawpaw, etc.; and in the bottoms, elm, sugar maple, ash, cherry, locust, linden, sycamore, buckeye, burr oak, shell-bark, blackberry, hickory, black walnut, plum, mulberry, etc. "This soil," says Professor Swallow, formerly State Geologist, "is very productive, and so deep and porous that the crops are but little affected by dry and wet seasons." The richness and fertility of the prairie lands is indicated by the luxuriant growth of grasses which originally covered them, and the magnificent crops of corn and wheat they now produce. The bottom lands border the many streams which traverse the county and are very flat, while extending back of these and in some places rising in abrupt bluffs are the uplands, which, as they recede, form high rolling timbered lands and broad undulating prairies.

PRICE OF LAND.

The average price of the improved and cultivated lands is from ten to twenty dollars per acre, and of the uncultivated land from five to ten dollars per acre, while small farms in the best agricultural districts can be rented for from two to three dollars per acre, or one third of the crop.

STREAMS AND SPRINGS.

The county has several splendid streams of water which, with their tributaries, traverse every neighborhood. The Lamine and Blackwater rivers and their numerous tributaries water the western portion of the county, the Petit Saline and its tributaries the eastern and central, and the Moniteau and its branches the southern. Never failing springs of fresh water abound in every direction, and water can be found anywhere within a few feet of the surface. There are also salt springs in several localities, which in an early day supplied the surrounding country with all the salt it used, and also mineral springs which are valuable on account of their medicinal properties, the most noted of which is the Chouteau Springs, in the western part of the county.

AGRICULTURAL.

But notwithstanding the immense stores of wealth that lies beneath her soil, the rich forests that cover her hills and valleys, and the magnificent streams which extend in every direction, thus making her one of the most favored spots on the continent for the development of mining and manufacturing interests, Cooper county is one of the foremost agricultural counties in the State, and her people look to the development of agricultural resources as their surest hope of future wealth and greatness. Professor Campbell, in an article upon "The Material Wealth of Missouri," published in Switzler's History of the State, says: "The county of Cooper alone produces yearly from its farms more than one-half the value of all the annual mineral products of the State." This seems almost fabulous, yet it does not give the least conception of the capabilities and possibilities of the county. Only when it is considered that there is not produced a one-hundreth part of what the soil s capa ble of, can its resources be fully appreciated and understood. But little more than one-half of the lands are now cultivated, and those that have never been made to produce to their full capacity, because the farmers here, as in every new country where land is rich and plentiful, have hitherto relied more upon the fertility of the soil than upon labor and skill for the production of their crops. Owing to the climate and the variety of her soils, Cooper county produces nearly everything that grows on the continent. Wheat, corn, oats, barley, buckwheat, blue grass, timothy, rye, clover, millet, tobacco, broom corn, sorghum, castor beans, potatoes, turnips, and all kinds of garden vegetables, are the common products of the soil, while apples, peaches, pears, plums, apricots, cherries, grapes and other fruits are grown in the greatest abundance. The census of 1870 shows that only three counties in the State, of an equal or less area and population, surpassed Cooper county in the annual result of their agricultural productions; that only four of an equal or less area and population produced more corn, and only three more wheat. The apple crop for one year has been estimated at 30,000 barrels. Grape culture is another very important branch of industry in Cooper county, it being one of the leading counties in the State in that particular. The climate and soil seem peculiarly adapted to the culture of several varieties of the grape, the most common of which are the Virginia Seedling, Concord and Catawba. Large quantities of wine of a very superior quality are annually made in the vicinity of Boonville, the county seat, whose surrounding hills covered with vineyards, have given it the appellation of the "Vine Clad City of Missouri."

Crop Reports.

1880

Articles.	No. of acres.	Yield per acre
Cultivated in corn	80,000	30 bushels.
Cultivated in wheat	110,000	20 bushels.
Cultivated in oats	20,000	50 bushels.
Cultivated in sorghum	500	
Cultivated in timothy and clover	119,400	½ ton.
Cultivated in vineyards	100	

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	70,000	12 bushels.
Cultivated in wheat	120,000	8 bushels.
Cultivated in oats	18,000	30 bushels.

Remarks.

No rain for eight weeks prior to August 29th; chinch bugs worse than ever before.

CRAWFORD COUNTY.

Population, 10,774. Crawford is the second county southwest of St. Louis, through which the St. Louis and San Francisco Railway passes. It is also intersected by the St. Louis, Salem and Little Rock Railroad, and contains two branch railroads leading to two of its iron mines.

AREA AND SURFACE CHARACTERISTICS.

Its area is about 800 square miles, or 512,000 acres, of which about 50,000 are improved.

The surface of the county is generally rolling and mostly timbered, with all the varieties of hard and soft wood that grow in this latitude. There are hills, ridges, valleys, bottoms, flat uplands and some prairie.

The principal streams are the Meramec, which traverses the county from southwest to northwest, Courtois, Huzza, Dry Creek, Crooked Creek, Benton Creek, Clear Creek, Brush Creek, Whittenburg and Yadkin.

SOIL AND AGRICULTURAL PRODUCTS.

Good bottom land is found along these streams, and rich soil is also in the valleys. The uplands, though not so rich, are well adapted to the growing of wheat and other small grain. There is no swamp land of consequence in the county.

Besides being well adapted for raising grain of all kinds, the county cannot be excelled in growing grass, potatoes, melons, and raising fruit and all kinds of stock. The unimproved land is a vast pasture, and the laws of the State do not require stock to be enclosed.

Acorns, walnuts, hazelnuts, hickorynuts and hackberries often furnish sufficient feed to keep hogs nearly through the winter.

Of the wild fruits there are crabapples, cherries, plums, persimmons, pawpaws, gooseberries, blackberries, raspberries, whortleberries, strawberries, serviceberries, mulberries, hackberries, black haw, red haw, sugar haw, and a great variety of grapes.

DADE COUNTY.

Population, 12,551. Dade county lies in the third tier of counties north from the Arkansas line, and in the second east from the Kansas line, occupying the central portion of that fertile and beautiful portion of the State known as Southwest Missouri, and situated on the western slope of the Ozark Plateau, at an elevation of 1,300 feet above the level of the sea. It contains 320,000 acres of land about equally divided between timber and prairie. Several bold, swift streams flow through the county from south to north, furnishing unlimited water-power; the number of miles of streams which can be and are utilized for that purpose, amount to fifty-seven. The face of the country along these streams is rolling upland, covered with a dense growth of oak, hickory black walnut, ash and other hard wood, while the bottoms are exceedingly rich, and are covered, where not cultivated, with a luxuriant growth of soft maple, sycamore, elm and black walnut. Several small but fertile prairies are found between these streams on the uplands, well settled and under a high state of cultivation. West of these streams, and composing the entire western half of the county, the broad and fertile prairies stretch away to the great plains. The streams which water this grand region flow but a few feet below the general level of the prairie, and are bordered with narrow strips of timber.

SOIL.

The uplands in the eastern part of the county consist of a red clay subsoil, covered with what is termed a "mulatto" soil, which, for wheat and tobacco, is unsurpassed. The valleys along the streams consist of alluvial deposits of rich black loam overlaying sub-deposits of clay and gravel, and yields corn averaging from eighty to one hundred bushels per acre, according to the thoroughness of cultivation. The prairie is similar to that of Illinois and Iowa, and grows all kinds of cereals in extra abundance. Water is found in abundance at a depth of from twelve to twenty-five feet, of the best quality and entirely free from alkali or other deleterious ingredients.

LAND AND CULTIVATION.

About one-fourth of the land in Dade county is under cultivation. There are about three thousand acres of Government land in the county subject to pre-emption and homestead. The unimproved lands are

pretty evenly distributed throughout the county, and consist of both timber and prairie. Improved farms can be purchased at from eight to twenty-five dollars per acre; unimproved land at from two to eight dollars, according to quality and location. There are thousands of acres of this cheap prairie land only awaiting purchasers, which will pay for itself the first crop. Fencing material consists of stone, rails, wire, plank or Osage Orange, the latter of which is indigenous to the soil, and is used almost exclusively in the prairie portion of the county.

THE CLIMATE AND HEALTH.

Situated in the latitude of Richmond, Virginia, the winters are mild and short, while the elevation, combined with pure breezes from the West during the summer, tempers the heat, which is felt in other regions in the same latitude. With two or three exceptions the mercury has not fallen below zero in ten years, while in summer it seldom rises above ninety degrees in the shade. Very little snow falls, and stock requires little feed during the so-called winter months. The prevailing diseases are pneumonia in a mild type during the winter months, and ague to the same extent, and in isolated cases, and owing to causes incident to opening up and turning the virgin soil in all new countries. Lung and bronchial diseases are comparatively unknown. The water is pure and healthful, and springs of hard and soft water flow from every hillside in never-failing streams.

AGRICULTURE AND PRODUCTION.

Everything can be raised here which grows in this latitude. There is no region in the west better adapted to the production of grain, fruit and vegetables. The finest quality of wheat is raised, with mills at our doors to convert it into flour. Winter wheat is grown exclusively, yielding from fifteen to thirty bushels per acre. Corn is perhaps a leading crop. Most of the crop is fed in the country, and large herds of cattle and hogs are annually driven into the county from other sections for this purpose. Other productions of the soil are castor beans, oats, barley, millet, flax, broom corn, sorghum, buckwheat and rye, Irish and sweet potatoes, turnips, carrots, tobacco and cotton. Of the grasses, timothy, red top, blue grass and clover do well.

RAILROAD FACILITIES.

The Springfield and Western Missouri Railroad, now being completed, runs through the county from east to west, the number of miles in the county being about thirty-two. This road connects with the St.

Louis and San Francisco Railroad at Springfield, and with the Missouri, Kansas and Texas Railway, and Missouri River, Fort Scott and Galveston Railroad, at Fort Scott, Kansas, giving us connection both with Kansas City and St. Louis. The Sedalia, Warsaw and Southern Railroad, a narrow gauge, is building from Sedalia south to some point on the St. Louis and San Francisco road, and the main line, or a branch thereof, will run through Dade county from north to south.

DALLAS COUNTY.

Dallas county is located in the southwest central part of the State, about one hundred miles from the southern and the same distance from the western boundary of the State; is bounded north by Hickory and Camden counties, east by Laclede, south by Webster and Greene, and west by Polk and Hickory counties, and contains 344,931 acres of land. There are entered and assessed 220,000 acres, leaving 124,931 still vacant, nearly all of which is subject to homestead entry.

The physical features present a varied surface, from the level to the gently undulating and rolling land, whilst in the vicinity of the larger streams it is broken and hilly. From one-fourth to one-third of the county is prairie; the remainder is well timbered—the uplands with post, black, white, red and blackjack oak; the bottoms with burr, Spanish and chinquapin oak, black and white walnut, hickory, ash, elm, cherry, maple, sycamore, etc.

The soil is fertile, and adapted to a wide range of products. The black loam, the brown, the red, the rich alluvial, with clay subsoils, may be enumerated as the leading varieties.

The agricultural productions are wheat, corn, rye, buckwheat, barley, oats, sorghum, tobacco, castor beans, flax, cotton, potatoes, and all kinds of vegetables usually produced in this climate. Apples, pears, peaches, plums, cherries, apricots, nectarines, grapes and all the small fruits are grown in great abundance.

Timothy, red top, clover, Hungarian, millet, blue and all the grasses grown in the State, are probably not surpassed in quality and quantity of yield per acre in any county in the southwest. The same remark may be made of all, or nearly all the other agricultural pro-

ductions of the county, and the average yield, with proper tillage, will compare favorably with the best sections of the State.

Crop report not full.

1881.

Articles.	Yield per acre.
Estimated yield of wheat per acre	6 bushels.
Estimated yield of corn per acre	18 bushels.
Estimated yield of oats per acre	15 bushels.

REMARKS.

Estimated number of acres not given; damage done to the crops by fly, drouth and chinch bugs.

DAVIESS COUNTY.

Population, 19,174. Daviess county is situated in Northwest Missouri, in the second tier of counties from the north line of the State. It is twenty-four miles square, and contains an area of 359,633 acres of land.

AGRICULTURE AND GRAZING.

There is no county in the State that will rank in advance of Daviess for agricultural advantages and grazing. The soil is from one to six feet deep, very rich and productive—a soil that will not wear out. The formation of the surface of this county displays a natural drainage in its highest perfection. The beds of the streams are below the general level of country, and sloughs of standing water are rarely seen. The ascents and descents of the country are not so abrupt as to prevent the tillage of the entire surface of the land. The soil of the Grand River Valley, which runs diagonally through the county from northwest to southeast, is not surpassed by that of any other country in the Union. This county

contains about two-thirds prairie and one-third timber lands, the timber being situate advantageous to the prairie, as if placed by human hands for the convenience of man.

Indian corn, wheat, oats, rye, barley and other small grains, are peculiarly adapted to the soil of this county. It will yield from forty to one hundred bushels of corn per acre; winter and spring wheat, from fifteen to thirty-five bushels; rye, twenty to forty bushels, and a crop that never fails; oats, from thirty to sixty bushels; flax, ten to fifteen bushels per acre, and all other small grains in proportion. The timber lands produce good tobacco and a profitable yield. Irish and sweet potatoes of the finest quality are grown, and are particularly adapted to this soil, and will yield from three hundred to four hundred bushels per acre. The grasses consist of timothy, clover and blue grass, all of which grow in abundance. The blue grass pastures are not surpassed by the blue grass regions of Kentucky. There is yet a very good range of wild grass, but it is being crowded out by the blue grass, which is superior.

Daviess county has been blessed by the munificence of nature with native fruits in great abundance. The strawberry, plum, raspberry, gooseberry, blackberry, and the wild grape, are native growths in this county. These are also successfully cultivated to a great extent and with a large profit. A great quantity of wine is made from the tame grape.

Apples, peaches, pears, plums, cherries and all other fruits of this climate, are extensively raised. The fruit-bearing trees in this county are numbered by the thousands. There is not probably a farm in the county that does not have more or less fruit trees, mostly bearing. Daviess county is situated in the great fruit belt, extending from the Ohio river on the east to the Missouri river on the west.

TIMBER.

Enough timber is found in this county to supply half a dozen generations yet to come. The burr oak, white oak, hickory, black walnut, maple, elm, cottonwood, linn, white and blue ash, hackberry and mulberry grow spontaneously and to a great size.

RAILROADS.

The Wabash, St. Louis and Pacific railway enters the county near the southeast corner, and passes diagonally through it and out near

the northwest corner, running along the Grand River Valley, making a continuous and direct line from St. Louis to Council Bluffs and Omaha.

The Chicago, Rock Island and Pacific railroad enters the county at the southwest corner and passes diagonally through and out near the northeast corner. It is one continuous line of railway from Leavenworth, Kansas City, Atchison and St. Joseph to Chicago, Illinois.

LAND AND ITS PRICE.

Lands are now cheap, owing to the fact that many of the first settlers bought more lands than they needed, and are now selling it to others who are rapidly improving it. Good improved farms can be bought from ten to twenty-five dollars per acre; good unimproved land from five to ten dollars per acre, and all upon reasonable terms.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre
Wheat harvested	75,000	10 bushels.
Oats harvested	9,000	40 bushels.
Corn cultivated	75,000	25 bushels.
Flax cultivated	1,200	8 bushels.
Tobacco cultivated	100	
Apples cultivated	1,000	4 bushels.

REMARKS.

Drouth and chinch bugs ruined the late crops.

DeKALB COUNTY.

Population, 13,343. DeKalb county is bounded on the north by Gentry, east by Daviess and Caldwell, south by Clinton and west by Buchanan and Andrew counties. Its western boundary is about fourteen miles east from the city of St. Joseph. It contains 263,608 acres of land.

PHYSICAL FEATURES.

The surface is undulating and diversified by prairies and woodland. The county is well watered by Big Third Fork, Little Third Fork, Castile, Grindstone and Lost creeks, and numerous smaller streams, all of which are bordered by a fine growth of oak, walnut, hickory, hackberry, elm, soft maple, cottonwood and ash. About one-fifth of the land is well timbered. The soil is fine, and the bottom lands are exceedingly rich, and there is no part that will not yield a good return for the labor bestowed. Almost all the streams are well bridged, and the roads are generally excellent.

AGRICULTURAL RESOURCES.

The products are chiefly corn, oats, wheat and hay. The country is well adapted to stock raising, and much blooded stock has been imported. The first Durhams were brought here in 1857, and large additions have since been made. An imported breed of hogs was introduced in 1855, and now the hogs of the county are equal to any in the State. Fruit succeeds well and considerable attention is now being paid to it.

CROP REPORT.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	142,000	30 bushels.
Cultivated in wheat	8,000	10 bushels.
Cultivated in oats	32,000	25 bushels.
Cultivated in sorghum	500	
Cultivated in tobacco	50	
Cultivated in timothy and clover	10,000	
Cultivated in vineyards	200	

DENT COUNTY.

Population, 10,647. Dent county is bounded by Crawford, Phelps, Texas, Shannon, Reynolds and Iron counties, contains, altogether about 450,000 acres of land, divided about as follows:

Rich valleys and bottoms	75,000 acres
First-class uplands	75,000 acres
Second-class uplands	150,000 acres
Unfit for cultivation	150,000 acres

That part classed as unfit for cultivation is nearly all good timbered land, including about 50,000 acres of excellent pine lands that will manufacture, upon an average, 5,000 to 8,000 feet of first-class pine lumber per acre. And all the land not fit for cultivation produces excellent wild grass, and makes good feed for stock from April to December.

CHARACTER OF THE LAND.

There is now in cultivation about fifty or sixty thousand acres of lands about equally divided between bottoms, valleys and uplands.

The valleys are from two to eight hundred yards wide, sloping gradually from the top of the Ozark Mountains, and contain as fine soil as can be found in the State. Although the county is situate so as to include the mountain summit, it has more level lands and the surface is less broken generally than the other counties of south central Missouri.

LAND PRICES.

Lands are selling at reasonable prices, but are being held at some higher figures than even six months since.

There is but a small amount of government land in the county, most of it having been entered under the graduation laws, so that if it is desired to enter lands directly, the immigrant cannot be accommodated here. But the fact that the lands are about all entered does not increase the costs of the unimproved portion to any great extent. That which is suited for cultivation can be bought at from one dollar and a half to three dollars per acre, the titles in each case being good.

RAILROADS AND TOWNS.

The St. Louis, Salem and Little Rock Railroad runs to Salem, the county seat, and near the center of the county.

Salem is a thrifty town of about 2,000 population, and bids fair soon to become the queen city of the Ozarks. There is as much life and activity displayed there as in any town in the State of the same size.

PRODUCTIVENESS.

The lands of the county vary greatly as to quality, but, keeping out of the valleys, which are generally of a deep, rich loam, and liable to wash from the freshets, the upland is sandy and well adapted to the raising of small grains. The average yield of wheat in ordinary years being from twelve and a half to fifteen bushels to the acre, although when properly cultivated the yield is often more than doubled, and the instances are many where it reaches twenty-five, thirty, and even forty bushels.

DOUGLAS COUNTY.

Population, 7,753. Douglas county is situated between latitude 36° 50′ and 37″ north and longitude 92° and 93″ west from Greenwich.

The length of the county is forty-five miles and width eighteen miles. It area is 810 square miles. The principal streams are the North Fork and Bryant's Fork of White river, Big Beaver, Spring creek and a great number of smaller streams of running water.

The climate is mild and salubrious. At no time is it so cold but what persons may perform their daily avocations with comfort, and in summer the heat is not as intense as in some of the more northern counties. At no time within the recollection of the oldest inhabitants has the thermometer run five degrees below zero nor higher than one hundred above.

The county is situated at the foot of the Ozark Mountain on the south, thereby causing swift running streams. The mountains form the watershed of all the streams south of them in the State.

The surface is composed of hills and valleys, and there is also considerable bottom land. The soil is varied. The bottom lands or creek valleys are composed of a rich, productive soil, which yields good crops of corn and cotton. The uplands include fine farming and grazing land. Stock of all kinds do well. It is particularly adapted to raising stock such as cattle, sheep and hogs. There is abundance of mast, and hogs will fatten on it. There is a rich and spontaneous growth of grass on the hills and the uncultivated portion of the valley lands, affording plenty of pasture for cattle and sheep. There is plenty of pure water for stock furnished by the streams described as above, and we might say thousands of never-failing springs of the purest water. The climate, range and water keep the stock free from all disease.

The principal products are corn, wheat, oats, cotton and tobacco. Fruits of all kinds are grown in such abundance that there is as yet no local market for it.

COST OF LAND.

There is in the county 518,048 acres of land, of which 130,648 acres are taken up. There are 14,400 acres of school land, 5,000 of indemnity land, and 23,440 acres of agricultural college lands, leaving a total of 385,000 acres of government land subject to homestead entry. The

whole cost of making a homestead entry of one hundred and sixty acres is about fifteen dollars, making about nine cents per acre. Besides here are about 7,000 acres of township school lands not yet surveyed hat can be bought for twenty-five dollars per acre; also 28,040 acres of ndemnity and college lands that can be bought at the same price, and mproved farms sell at three to ten dollars per acre, owing to locality nd improvements.

DUNKLIN COUNTY.

Population, 9,604. Dunklin county is in the extreme southeastern portion of the State (it and Pemiscot being the extreme southern counties); it is bounded on the north by Stoddard county, on the east by New Madrid and Pemiscot counties, on the south and west by the State of Arkansas. It is forty-four miles long, and varying in width from ten to twenty-four miles.

SURFACE CHARACTERISTICS.

The soil, for the greater part, is a black, sandy loam, of unsurpassed fertility, equal if not superior to any in the Mississippi Valley. The western portion of the county, bordering on the St. Francois river, bounds in fine valuable timber, such as ash, black walnut, white oak, poplar, hickory, etc. There have been several million feet of fine black walnut lumber shipped from Malden this season.

AGRICULTURAL RESOURCES.

The principal products are cotton, corn, wheat, peanuts, castor beans, etc.

It is estimated that there are 62,400 acres in cultivation, one-fourth of which, 15,300 acres, was in cotton in 1879. The gin reports show over 4,000 bales ginned in the county. Few of these bales weigh less than five hundred pounds, and often as much as seven hundred pounds. The revenue to the county from cotton alone will not fall short of $750,000 for the year. The corn crop is estimated at 3,000,000 bushels. The annual shipment of cattle is about 16,000 head, and hogs about 20,000

head. The annual revenue from fur is about $15,000. There is exce
lent range for both hogs and cattle, and it is never necessary to fe
them more than three or four months in the year.

A failure in crops in this county is impossible, unless from wa
of cultivation. The heaviest rainfall only hinders farmers a few hou
whereas, in a clay soil, it would require two or three days drying. O
the other hand there exists no danger from drouth, as the water is
near the surface of the ground that during the most severe drou
moisture enough will rise during the night to keep the crops in go
growing condition.

PRICE OF FARMS.

Improved farms are held at a tolerably high figure, persons owni
such farms being content to live on them, knowing that they could n
better themselves elsewhere. Land partially improved can be boug
at from five to ten dollars per acre. Unimproved land can be bou
much cheaper; there are large tracts of fertile, unimproved lands th
can be bought for two dollars per acre, and on terms that will suit a
kind of a purchaser.

RAILROADS.

The Little River Valley and Arkansas Railroad is now runni
from New Madrid, on the Mississippi river, to Malden, and will shor
be extended into Arkansas, west, and to Cape Girardeau, on the oth
end.

A route has been surveyed from Dexter through the country sou
which will doubtless be built soon, and will give the country all t
railroad facilities she needs. Upon the whole, no other county in t
State can hold out more and better inducements to immigrants th
Dunklin county.

FRANKLIN COUNTY.

Population, 26,536. Franklin county is situated in the central po
tion of Eastern Missouri, and is bounded north by the Missouri riv
east by St. Louis and Jefferson counties, south by Washington a

Crawford counties, and west by Gasconade county. The county was organized in 1819. Union, the county seat, was located in 1826, at the geographical center of the county.

The area of the county is 559,360 acres, one-third of which is under cultivation, one-third may be classed as mining lands, and fully one-half is more or less wooded or timber lands.

RAILROADS.

Two railroads traverse the county. The Missouri Pacific skirting the northern line along the channel of the Missouri river. The St. Louis and San Francisco road passes through the eastern half of the county diagonally, and joins the Missouri Pacific road at the town of Pacific, in the northeast corner of the county, from where the two roads use the same road-bed to St. Louis.

These two railroads, supplemented by the Missouri river, give ample freight facilities for all the products and manufactures of the county, and brings every town, hamlet and farm in close connection with St. Louis and the Eastern and European markets.

AGRICULTURAL.

The lands along the streams, known as second bottom, and the hill slopes and ridge lands for general farming cannot be surpassed. Corn yields in the bottoms eighty to one hundred bushels to the acre; wheat on the uplands fifteen to twenty-five bushels. Fruits of all kinds grow abundant on the hill tops and along the rock ridges. This country is well suited to vegetables, fruits and root crops. There is a home market for everything the farmer can raise among the mining population, which, in a few years, will be counted by the tens of thousands.

PRICES OF LAND.

Large amounts of land are in market for sale at from one dollar and fifty cents to two dollars and fifty cents for wild lands, and farms with fair improvements at eight to twenty-five dollars per acre.

Crop Report.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in wheat	25,000	12 bushels.
Cultivated in oats	10,000	20 bushels.
Cultivated in corn	50,000	10 bushels.
Cultivated in tobacco	2,000	200 pounds.
Cultivated in apples	5,000	20 bushels.

Remarks.

The drouth has been unprecedented, and some chinch bugs, but not so many as the prairie counties.

GASCONADE COUNTY.

Population, 11,173. Gasconade county became a municipal corporation immediately after the admission of the State into the Union in the year 1821, as on the 15th day of January of that year the first county court was organized. In the year 1828 the first permanent county seat was located at Mount Sterling, and in 1842 said county seat was removed to Hermann, which removal, together with the burden of debt left on the county after its division into Osage and Gasconade counties, brought Gasconade so into debt that county scrip was exchanged at twenty-five cents on the dollar.

The increase of population, with the consequent thrift and enterprise, soon afforded means of liquidating the obligation, and for many years past affairs have been so judiciously managed as to leave the county entirely free from debt and in a prosperous condition.

The county is situated south of the Missouri river, and about eighty miles west of the Mississippi river, in ranges four, five and six, west o

the fifth principal meridian of the United States, and in townships numbers 40, 41, 42, 43, 44, 45 and 46, north of the base line, and contains 323,176.65 acres at an assessed valuation of $1,533,578, while the assessed valuation of the personal property in the county is $1,130,207.

There is almost every variety of surface characteristics and soil. The rich bottom lands of the rivers and small streams, the level and undulating prairies, the hickory and post oak table lands, gentle slopes and steep hillsides, variegated with hills, hollows, caves, cliffs, bluffs and deep ravines, making it healthful and peculiarly adapted to the wants of the most capricious. There is an abundance of timber for all ordinary purposes.

The lowest bottoms are the most fertile; next in order of fertility are the gentle slopes when covered with a mixed growth, as white oak, black and white walnut, shell-bark hickory, with hazel or sumac underbrush. Of the third class are the pin oak, shell-bark hickory and prairie lands. Of the fourth class are the white oak, black oak and white hickory lands, when intermixed with sumac and hazel undergrowth. The post oak table lands belong to the fifth class, and the black-jack with white clay undersoil, to the sixth.

It is a uniform characteristic of all the uplands, that from the dark red undersoil the fertility gradually declines until the white clay lands, the least fertile of all, are reached.

In the northern and western portion of the county the surface is very hilly; in the eastern, the slopes are more gentle; while the southern portion forms small plateaus, these being separated from the streams by steep hills, bluffs or gentle slopes.

There are about 3,500 acres of prairie land lying nearly in one tract between the headwaters of the Third creek and the Bourbois river. There is but little bottom land along the Missouri river, the hills terminating abruptly at the water's edge. The large tract of about 1,600 acres in the northwestern corner of the county is the only one of note. The largest tracts of bottom land are near the mouth of the Second creek on the Gasconade river, about the center of the west line of the county; smaller tracts are found near other water courses.

Along the tributaries of the Gasconade river the rock is limestone; on the other streams it is chiefly sandstone or flint.

AGRICULTURAL RESOURCES.

The inhabitants are engaged chiefly in agriculture. Nearly 60,000 acres are already in a high state of cultivation, and about as much more may still be reduced to tillage, and land is for sale at prices ranging from one dollar to fifty dollars an acre, and on long terms.

TRANSPORTATION.

The facilities for cheap transportation are very good. The Missouri Pacific Railway passes through the entire width of the county along the northern part, and the southern part of the county extends within twelve to fifteen miles of the St. Louis and San Francisco Railroad, while the grand Missouri river, with her fine and regular packet and passenger steamers, give another mode of shipment. The river and railroad accommodations can hardly be surpassed. There are four steamboats owned here and run in the interest of the county.

GENTRY COUNTY.

Population, 17,202. Gentry county is part of the beautiful "Grand River Country," adjoining the Platte Purchase, and on its eastern boundary, and is equal if not superior to the latter in fertility of soil, smoothness of surface, abundance of water and timber, and in all the other essentials that constitute the make up of a rich and prosperous country.

The county is bounded on the west by Nodaway, on the east by Harrison, on the south by DeKalb and on the north by Worth counties. It is only twelve miles south from the Iowa line and thirty miles northeast from St. Joseph and is at the center of the richest corn, cattle and hog producing country in the United States. The county is twenty-four miles long by twenty and one-half wide, and has an area of 322,880 acres, all available for farming purposes and nearly all susceptible of cultivation. There is no waste land in the county.

The population of the county is composed of as thrifty, orderly, quiet and law-abiding a set of people as live in the older States.

The face of the country is undulating, sufficiently so as to afford good natural drainage, and is divided up into beautiful prairies, lying between the three forks of Grand river, which traverse the county a few miles distant from each other, bordering the prairies with belts of oak, walnut and other timber valuable for farming purposes, while the prairies are dotted over in every direction with groves of timber, which seem to have been designed by nature to adorn th

home of the settler and to afford shelter for his domestic animals. The river bottoms are wide and high, generally above overflow, and the county is especially favored with a large proportion of this class of the most valuable farming land.

The soil is a dark alluvial, of surprising depth even on the highest prairies, as is everywhere amply shown by the luxuriant growth of the crops of corn, wheat and grass; and the river bottoms differ in this respect from the prairies only in the soil being an unnecessarily greater depth; the subsoil is wonderfully capable of withstanding both drouth and excess of moisture equally well; in the latter case it absorbs water like a sponge and retains a sufficiency to withstand all demands that may be made upon it during a spell of dry weather.

THE CROPS.

All the products of this latitude are a success here. It is a grand corn country, and from 1,500,000 to 3,000,000 bushels are annually grown, the yield ranging from thirty-nine to ninety bushels per acre. Wheat is an excellent crop, especially in the oak and hickory timber soils, where fifteen to thirty-five bushels per acre are raised by good farmers with as much certainty as in Nebraska or Minnesota. Oats are generally a heavy crop, giving thirty to seventy bushels per acre. Rye is an unqualified success. Barley does well. Buckwheat, broom corn, tobacco, hemp, sorghum, Hungarian, millet, vegetables without end, fruits and grasses, all flourish in this rich soil.

The fruit interest prospers here, as everywhere in North Missouri. Fine, thrifty, fruitful orchards, vineyards and small fruit yards attest the success of this noble industry in every neighborhood, and the production of apples, pears, cherries, peaches, grapes and smaller garden fruits of the highest quality might be carried to mammoth proportions, while the vast population which will soon occupy the Upper Missouri Valley to the northwest, beyond the fruit line, and to which the shortest possible line of railroad connects, will afford a market almost at the door of the farmer, without an equal in the West.

The railroad facilities are unsurpassed. The St. Joseph and Des Moines Railroad having been completed from St. Joseph to Albany, is now owned and operated by the Chicago, Burlington and Quincy Railroad Company, which is about to widen and equip it as a standard gauge and complete it from Albany northward to a connection with the Atchison, Topeka and Santa Fe Railroad via St. Joseph, making, when they are all consolidated into the hands of one company, the grandest and most important railroad line on the continent.

The Council Bluffs and St. Louis Branch of the Wabash, St. Louis and Pacific Railway also passes through the center of the county, giving a through line to Chicago and St. Louis on one hand and to Council Bluffs and the Upper Missouri Valley on the other, and at Darlington, the intersection of the two roads, competition will give shippers better rates than can elsewhere be had in Northwest Missouri outside of St. Joseph, greatly to the advantage of those who live within reach of that thriving new town. The Quincy, Missouri and Pacific, already completed to Milan, only sixty miles east of Gentry county, is likely to be completed to a connection with the Wabash Railway (which company now own it,) at some point in Gentry county during the present year.

GREENE COUNTY.

Population, 28,817. Greene county is a central county of Southwest Missouri; is bounded on the north by Polk and Dallas, east by Webster, south by Christian, and west by Lawrence and Dade counties, and comprises an area of 465,622 acres. It lies for the most part upon what is known as the summit of the so-called Ozark Mountains, a series of table lands, delightfully undulating, and is made up about equally of timber and prairie, interspersed with clear, bright and rapid streams that flow over beds of gravel. Springfield, the county seat, is 241 miles from St. Louis, on the line of the St. Louis and San Francisco Railway, and contains a population of about 8,000. The first settlements in the county were made in 1829–30, by a few adventurous spirits from east Tennessee. The population of the county in 1840 was 5,372; in 1850, 12,785; in 1860, 13,186; in 1870, 21,549. The present population is estimated at 30,000, while the taxable wealth foots up over $10,000,000. The inhabitants are made up of people from nearly every State and section of the Union.

As an agricultural region, Greene county ranks with the most favored. It is eminently a wheat growing county, while corn, rye, oats, potatoes and tobacco yield abundant returns. It is a natural blue grass region, furnishing good pasturage for stock three-fourths of the year.

LANDS AND SOILS.

Greene county shows many varieties of soil, which may be roughly classed as follows:

First—The mulatto soil, a rich reddish, friable loam, well suited to the growth of corn, wheat and other cereals, and producing well any crop suited to this latitude. This is the prevailing soil of the county.

Second—The coarse grained, or black soil, which is very much like the best Illinois prairie. It is rich, easily worked, and produces well in all crops.

On Kickapoo prairie, south of Springfield, are large areas of this soil, and it is also found in portions of the valley and bottom lands of the county.

Third—The post oak soil, so named from the prevailing growth of timber upon it. This land generally lies very level and free from stone. It is a heavy clay of a whitish brown color, and is the best land for tobacco, producing a choice article of that crop. Grass, also, does remarkably well on this soil, and meadows sown on it remain in good condition an indefinite length of time, and produce heavy crops of timothy for many years.

With proper cultivation the post oak kind produces good crops of wheat and oats, but it is not so well adapted for corn.

Fourth—The fine grained, black soil, rich as any land can be, but generally lying low, and too wet for cultivation in ordinary field crops. It will, however, produce very heavily in meadow, and where so located as to be cultivated, yields abundantly in corn or oats. There is but little of this soil in the county.

The county is well watered by numerous large and small streams, fed by never-failing springs. The Pomme de Terre river, East Fork of Sac river, James river, and the numerous tributaries of these streams intersect every portion of the county, forming fertile valleys, interspersed with prairie and strips of timber land.

PRICE OF FARMS.

Cultivated or improved lands are worth from ten to fifty dollars per acre. Unimproved lands are valued at from two to fifteen dollars per acre. Town lots in Springfield, 80 by 200 feet, are held at from seventy-five to three hundred dollars. Good, well located houses, containing three or four rooms, may be had for five hundred dollars. The St. Louis and San Francisco Railway Company has for sale in Greene

county about 65,000 acres of land. This includes lands of all grades, and is scattered over the whole county, the grant extending for twenty miles from the railroad on either side. The prairie lands of the company have mostly been disposed of, but there are still many thousands of acres of the best soils, supplied with wood, water and pasturage, for sale on the easy terms offered by the company, viz: One-tenth in cash and the remainder in seven annual payments at seven per cent. interest. The railroad lands vary in price from two dollars and fifty cents to ten dollars per acre, and offer many excellent opportunities to settlers.

RAILROADS.

The railroad facilities, while not all that could be desired, and although falling far short of expectations in the near future, yet are of an excellent character. The St. Louis and San Francisco Railway, which now extends from St. Louis to the borders of the Indian Territory on the one hand, and into the heart of the State of Kansas on the other, is advancing with gigantic strides towards a position among the most powerful and enterprising railroads of the country, and it is now conceded will, under recent arrangements, be completed within a few years to the Pacific coast—making the great southern trans-continental route.

GRUNDY COUNTY.

Population, 15,210. Grundy is situated in the second tier of counties south of the Iowa line and nearly midway in the great pastoral region between the Mississippi and Missouri rivers, is twenty-one miles square and contains 282,000 acres.

Its county seat, Trenton, is sixty miles north of the Missouri river at Brunswick, and forty miles south of the Iowa line. The taxable wealth of the county is estimated at $3,250,000.

PHYSICAL FEATURES.

About three-fourths of the county is prairie, undulating and well drained, and its numerous streams are well wooded with valuable tim-

ber of all sorts common to the State. Native lumber is abundant and very cheap. The bottom prairies afford early range for stock, and the abundant timber welcome shade and shelter in summer and winter. The wild prairie grasses exist only in the bottoms, having given way to blue grass, which grows here without effort and kills out the native grasses. The county is well watered by North Grand river, and its numerous tributaries, the running creeks being about three miles apart. Very few counties in the State have such an excellent proportion of prairie and timber, interspersed with so may fine streams of water, capable of supplying abundant stock water in the dryest season.

The soil is black loam of great depth, rich and warm, and amply repays the efforts of the energetic farmer.

AGRICULTURAL PRODUCTS.

The early, nutritious bottom prairie grass, the luxuriant blue grass, and extensive timothy meadows, reaching into the hundreds of acres, combine to make Grundy a notable stock county, and this is its chief business.

Here are raised herds of fine and common cattle, which are mostly stall-fed. Droves of young cattle are sold every year to Kansas, Nebraska, Illinois, and the western Territories. Horses and mules are largely raised and sold to buyers from abroad who frequent this market. Sheep are largely raised, and the county is well adapted to wool-growing, which interest is largely on the increase, under the auspices of the County Wool Growers' Association, and made a specialty by some farmers.

Corn, wheat, oats, rye, potatoes, buckwheat, sorghum and all the productions common to the State, are here raised. Tobacco was formerly a staple, but of late has received small attention. The yield of corn is from forty to seventy-five bushels.

RAILROADS.

The Chicago, Rock Island and Pacific Railroad, technically known as the Iowa, Southern and Missouri Northern, runs twenty-seven miles through the county, entering centrally on the north passing *via* Trenton out of the northwest corner of the county. Trenton is a division and has the machine shops of the road. Trains west are run to Kansas City, Leavenworth and Atchison from this point.

The Quincy and Missouri Pacific survey runs through the county east and west, and is completed to a point thirty miles east of Trenton. Its speedy completion is a thing assured and greatly desired, and

will aid the material interests. The road from Trenton intersecting the Hannibal and St. Joseph and Wabash, St. Louis and Pacific at Chillicothe is expected to be completed this year. This will give Grundy and Mercer counties a direct outlet to St. Louis and turn the channel of trade lately directed to Chicago to the home metropolis, whose markets can be reached in shorter time and at less expense.

LANDS AND PRICES OF SAME.

There are no Government lands in Grundy unimproved, and good farms can be bought very low.

HARRISON COUNTY.

Population, 20,378. Harrison county is bounded on the north by Iowa, east by Mercer and Grundy counties, south by Daviess, and west by Worth county, and contains 464,294 acres. It lays in the northwestern part of the State, and is known as a part of the "Grand River Country." By the census of 1870 it contained a population of 14,635. The county was organized February 14, 1845, and named in honor of Hon. Albert G. Harrison.

PHYSICAL FEATURES.

The surface of the country is generally undulating, with a little lowland and a small portion that is broken. About four-fifths is prairie, and the balance timber, which is principally confined to the water courses, and though not abundant, it is sufficient for all practical purposes and consists mainly of oak, hickory, elm, walnut, ash, linn, etc.

The soil which is generally good, is a dark brown loam, one to three feet deep, with a small mixture of sand, and rests on a clay subsoil. Grand river passes along the eastern side from the Iowa line to within a few miles of the southeast corner of the county. It furnishes water-power almost the entire year. Big Creek, an affluent of Grand river, traverses the center of the county from north to south, while Sugar, Sampson, Cypress and some other smaller creeks drain the other parts of the county, and furnish an inexhaustible supply of water for stock of all kinds, the raising of which is carried on to a very large extent. The streams usually have rocky or gravelly beds and rapid currents.

AGRICULTURAL PRODUCTS.

The staples are wheat, corn, rye, potatoes, horses, mules, cattle, ogs and sheep. Flax, broom corn, sorghum, sweet potatoes, buck- heat and beans succeed well. Fruits and grapes are extensively and uccessfully cultivated.

RAILROADS.

Exports are taken from, and merchandise brought to, the county *via* ie Wabash, St. Louis and Pacific Railway on the south, the Chicago, ock Island and Pacific Railroad on the east, and the Burlington and issouri River Railroad on the north; the first being twenty, the second nty-six, and the last forty miles from Bethany, the county seat.

PRICE OF LANDS.

Unimproved lands of desirable quality can be purchased from five eight dollars per acre. Farms can be had from ten to twenty dollars er acre, according to locality and improvements.

HICKORY COUNTY.

Population, 7,388. Hickory county lies in southwest portion of he State, bounded north by Benton, east by Camden and Dallas, south y Dallas and Polk, west by St. Clair, and contains 260,998 acres.

Population in 1850	2,329
Population in 1860	4,705
Population in 1870	6,452
Population in 1880 estimated at	7,200

The face of the county is varied, being about two-thirds timber land and the balance prairie. The Pomme de Terre river entering on the south and running due north divides the county into two nearly equal parts. In the eastern part is Little Niangua creek, in the south- east are Crane creek, Ingles creek and Lindley. In the west are Little Pomme de Terre creek, Nagles creek and Weaubleau creeks. Springs are numerous, and afford an abundance of pure, healthful water. Water power on the several creeks and Pomme de Terre river is avail- able at a number of places. Along the streams are very fertile bot-

toms, back of which to the edges of prairies it is rocky, clothed with oak timber. The prairies are rich loam and are well cultivated. The bottoms are clothed with heavy timber, consisting of the various kinds of oak, hickory, walnut, sycamore, elm, ash, butternut, persimmon, hackberry, coffee bean, honey locust, maple and gum. The valleys and prairies are very productive. The broken country between the valleys and prairies are mostly too rocky for profitable cultivation, but abounds in ranges for stock, the grass on which is nutritious and abundant. In fact, no better stock growing county is to be found in Southwest Missouri than this.

The agricultural productions are wheat, rye, corn, oats, Irish and sweet potatoes, cotton, sorghum. Corn is the staple, and for fruit this county cannot be excelled. About two-thirds of the county is arable. There is still some Government and swamp lands in this county for sale.

RAILROADS.

There is no railroad running through this county. The Sedalia, Warsaw and Southwestern Railroad will pass through this county. No survey has yet been made south of Warsaw. The road-bed is, however, nearly completed to Warsaw, on the Osage river, twenty-five miles north of Hermitage, and the track laid down ten miles south of Sedalia.

LAND AND PRICES.

The lands in this county now belonging to the Government are not generally considered valuable. Unimproved arable land can be purchased at from two to five dollars per acre, according to location and quality; improved farms at from five to ten dollars per acre; and a few choice small farms, well improved, at prices something higher.

CROP REPORT.

1881.

Articles.	No. of Acres.	Yield per acre
Wheat cultivated	10,000	12 bushels.
Oats cultivated	12,000	20 bushels.
Corn cultivated	30,000	25 bushels.
Flax cultivated	2,000	6 bushels.

REMARKS.

Drouth and chinch bugs have cut all crops short by half.

HOLT COUNTY.

Population, 15,510. Holt county is situated in the northwestern portion of the State, and forms a part of that fertile tract of land known as the Platte Purchase. With Atchison county on the north and Nodaway and Andrew counties on the east, Holt has its entire western and southern borders on the Missouri river. Its area is 434 square miles, or 277,760 acres, including unsurveyed lakes and navigable rivers.

SOIL.

There are few distinct classes of soil in this county. About one-fifth of the county is bottom lands, which consist of alluvial deposits made by former overflows of the Missouri river. Of this soil there are two varieties. First, a silicious alluvial, intermixed with clay and humus, a vegetable mould. This is exceedingly fertile and produces immense crops of various cereals. It is light, friable and easily worked and withstands drouth. Second, a variety known as gumbo; a tenacious vegetable mould, that, after being thoroughly soaked with water, cracks in drying, leaving the land lumpy and difficult to cultivate. However, this gumbo is very fertile, and since it is underlaid by a strata of sand at a depth of twelve to fifteen inches, it is capabla of being subsoiled, and hence rendered very valuable land.

The bluff formation constitutes the third class of soil, and comprises about 80,000 acres, most of which is peculiarly adapted to fruit culture. It is here that the largest and most profitable vineyards and orchards are planted. The soil of this formation is porous and in many places exceedingly deep.

The fourth class embraces the upland prairies, which consist of a dark loam, intermixed with sufficient sand to make it porous. "Hard-pan" land, therefore, is unknown in Holt county, since intermixture of sand extends down to the rock strata, thus affording adequate drainage for excessive rains, while the soil retains sufficient moisture to withstand drouth. One-half of the bottoms and two-thirds of the uplands of the county are prairies, the uncultivated portions of which have heretofore furnished excellent pasture for large numbers of horses, sheep and cattle, and in addition thereto yielded from one to three tons per acre of good hay.

TRANSPORTATION.

The railroad facilities of the county are good, but will soon be greatly improved. The Kansas City, St. Joseph and Council Bluffs Railroad passes through from southeast to northwest, having 37.7 miles of road in the county, the assessed valuation of which is over $460,000. This road furnishes an outlet for grain and stock to both Chicago and St. Louis. There are also two new roads being built, one from Bigelow on the Kansas City, St. Joseph and Council Bluffs Railroad, to Burlington Junction, on the St. Louis and Omaha Road, and another, the Corning and Clarinda, from Corning, in the northwest part of the county, to Clarinda, Iowa.

HOWARD COUNTY.

Population, 18,428. Howard takes rank among the first settled counties of the State, having once been the home of the celebrated Daniel Boone, Colonel Cooper and other pioneer settlers of the great Mississippi Valley. It is centrally located, and is bounded on the north by Chariton and Randolph counties, upon the east and northeast by Boone, upon the west and south by the Missouri river, which separates it from Saline and Cooper. It contains over 285,000 acres of land, five-sixths of which are under fence and a large proportion of it in a high state of cultivation, containing many magnificent country residences and baronial estates.

AGRICULTURAL RESOURCES.

The lands of Howard county are divided into bottom lands and uplands. The bottom lands, which are comprised of those parts of the county which lie contiguous to the Missouri river, the Moniteau, and other streams, are generally level and exceedingly fertile, producing immense crops of wheat, corn and hemp when sown. The soil is simply inexhaustible, and is susceptible of being cultivated for a lifetime

without perceptible diminution of its fertility. The soil of these lands is a deep, sandy loam, absorbing moisture and giving it out like a sponge, so that they are not materially affected by drouth. The uplands are high and beautifully undulating, with splendid natural drainage. The soil is warm, quick and susceptible of the highest culture, producing large yields of all the cereals, fruits and vegetables known to this latitude. Tobacco is one of the staples of the county, much of these lands producing a very fine article when skillfully handled, and in some instances yielding 2,000 pounds per acre. This county, being in proximity to a large belt of now wheat-producing country, offers to the wheat-grower an inducement rarely met elsewhere.

COMMERCE AND TRANSPORTATION.

The commercial advantages of Howard county should challenge the consideration of every one desiring an advantageous location. The Missouri, Kansas and Texas Railway crosses the entire county from north to south, passing Fayette, the county seat, and thence on to Boonville, where it crosses the Missouri river on a magnificent bridge. This line is doing a lucrative business. The Chicago and Alton passes through the county east to west, crossing the Missouri river at Glasgow, in this county, on the great steel bridge—the structure of the age. There is also a branch line extending from the city of Glasgow, and intercepting the Wabash, St. Louis and Pacific at Salisbury. There are not only two magnificently equipped trans-continental lines of railroad running transversely across this county, but her western and southern borders are washed by fifty miles of the great Missouri river, capable of affording cheap and easy transportation for the products of an empire. Thus it may be seen that this county possesses facilities for transportation east and west, north and south, embracing a system beyond the power or control of corporation or monopoly.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre.
Cultivated in corn	65,000	35 bushels.
Cultivated in wheat	60,000	15 bushels.
Cultivated in oats	10,000	25 bushels.
Cultivated in sorghum	1,000	
Cultivated in tobacco	2,000	800 pounds.
Cultivated in timothy and clover	32,000	1½ tons.
Cultivated in vineyards	200	

1881.

Articles.	No. of acres.	Yield per acre.
Cultivated in corn	51,000	25 bushels.
Cultivated in wheat	100,000	10 bushels.
Cultivated in oats	17,000	30 bushels.
Cultivated in tobacco	1,000	300 pounds.
Cultivated in timothy	12,000	1 ton.

HOWELL COUNTY.

Population, 8,814. Howell county is situated adjoining the State of Arkansas, and nearly in the center of the State of Missouri from east to west. It was organized in 1857 from parts of Oregon and Ozark. It is forty miles north and south by about twenty-eight east and west.

SURFACE.

The surface of the county has a general southern slope, rolling, with table lands and oak openings. Along the streams, the surface is

broken, and in the southern part there are small prairies. The hills are irregular in their direction, and cannot be said to lie in ranges; their elevation is gradual from the valleys at the base to their summits. Irregular valleys lie nestled among the hills, varying in size, of which Howells, Hutton, South Fork and Spring creek are the principal. Some of these have streams of living water, others are dry, except springs whose waters run a few rods and disappear in the subterraneous passages to meet the light again at the head of Spring river, in Arkansas.

THE SOIL AND ITS PRODUCING QUALITIES.

The soil of the county is varied, and might properly be classified as follows:

1. Pine lands with a sandy loam, which occupy the most broken part of the county, underlaid by the sandstone of the magnesian limestone series. These lands produce well in wheat, corn and rye, with tame grasses. The timber is pine, post, white and red oak, black hickory, sassafras and summer grapes, and in many of the valleys other trees and vines, where luscious blackberries and raspberries abound. This covers large areas in the north and northwestern part of the county.

2. White and post oak soil covers a large territory and appears to be a mixture of the hickory with the magnesian limestone. The character of this is dark, warm and light, and in the valleys it is very productive; on the slopes lighter in quality and not so productive for the heavier crops; yet all yield, with proper culture, good crops of cotton, wheat, rye, tobacco and hay. The slopes cannot be excelled for fruit culture, and the finest of fruit, both in quality and size, is here grown. Particularly is this so with regard to the peach and apple, and we can safely challenge any of the fruit-growing States to produce superior. The subsoil of these lands is often richer than the surface and consists of dark-red oily clay impregnated with iron, and deep plowing makes a vast difference in their productive powers. Some of these lands are covered with flint and conglomerated rock, and in many places where these are the soil is the most productive.

3. The black-jack soil. This is generally the poorest of all, and cover the narrow and rocky ridges, and has a stunted growth of black jack and post oak. This soil is dark in color, thin and cold, and is underlayed with pale yellow or slate-colored clay. These lands can be made valuable for small grain and fruit culture, and all furnish excellent pasture of wild grass.

In the southern part of the county there are tracts of land that have yet a different soil peculiarly their own. This covers small prairies and some of the low lands adjacent to their streams. It is black, adhesive and rich, yet it is considered too wet, without draining, to produce first-class crops when the seasons are favorable for other lands. The low lands are gradually closing in with a thrifty growth of black elm, black hickory, ash, water oak, walnut, sycamore and hazel, on the small prairies, and within a few years they will be covered in woodlands. These lands afford the best pasturage in the county, and with proper drainage and cultivation are very productive.

The soil in the valleys is a compound of the rolling lands adjacent with decomposed vegetable matter, and each season adds new deposits. These are the most productive of any for corn, cotton and wheat, but for fruit are inferior even to the black-jack lands.

THE CLIMATE.

The winters are short, generally commencing about the 20th of December and remaining mild winter weather throughout the remainder of that month. January, February and March are varied with an occasional northwester lasting a few days at a time. In the average winter there are very few days that persons cannot work upon their farms with little inconvenience from the cold. In the valleys, particularly in the southern part of the county, the short, wild grass remains green all winter. The air is dry and contains no malarial swamp poisons to breed disease. Pulmonary disease, unless hereditary, is unknown.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre.
Cultivated in corn	12,000	15 bushels.
Cultivated in wheat	8,000	4 bushels.
Cultivated in oats	4,000	12 bushels.
Cultivated in tobacco	50	
Cultivated in apples	500	

REMARKS.

Wheat damaged by Hessian fly and chinch bugs; corn by drouth and chinch bugs.

IRON COUNTY.

Population, 8,183. Iron county is situated about seventy-five miles directly south of St. Louis, and about fifty miles west of the Mississippi river. It occupies the summit of the Ozark Plateau—the waters from the surface flowing north, east and south. No part of the globe is blessed with a greater abundance of pure water. Sparkling and crystal springs and streams flow over the land to fertilize it and gladden every creature.

Big river, Black river and St. Francois river have their principal sources within this territory. These streams are rapid and afford abundant water-power, very little of which is yet utilized.

HEALTHFULNESS.

The great elevation of this region, the entire absence of stagnant water, and the distance from any low or overflowed lands, make it beyond any doubt one of the most healthy sections in the Mississippi Valley.

THE SURFACE.

The general features of the country are decidedly undulating, in some places the hills rising to the dignity of considerable mountains, interspersed with fertile valleys and good upland, which yield excellent returns to the industrious tillers of the soil, in corn, wheat, oats, rye, barley, potatoes, tobacco, sorghum, and every variety of vegetable and fruit suited to the climate.

The country is covered with a forest of valuable timber of almost every kind and variety, and amongst this is a luxuriant growth of grass, which makes our region also rank high for grazing and stock raising purposes.

CHEAPNESS OF LAND.

Lands, both wild and improved, are cheaper in this region than in any other portion of the Union—quality and advantages considered.

Improved farms can be purchased to-day in Southeast Missouri, within 150 miles of St. Louis, at less cost than the wild, open prairie railroad lands.

MINERAL RESOURCES.

This county is the center of the great iron deposits of the State, as well as the Missouri Granite Works, and in this way a home market is produced for all farm productions, often superior to the city of St. Louis.

JACKSON COUNTY.

Population, 82,364. Jackson county is situated on the south side of the Missouri river and adjoining the State of Kansas. It is bounded on the north by Clay and Ray counties, on the east by Lafayette and Johnson counties, and on the south by Cass county. It is twenty-seven miles from east to west, and twenty-two miles from north to south, and comprises 387,450 acres.

TOPOGRAPHY.

The surface of the county is gently undulating, except along the streams, and is about equally divided between timber and prairie lands. It is unsurpassed in fertility of deep, rich and loamy soil, with abundant streams and never failing springs. The Missouri river washes the entire northern boundary for a distance of forty miles.

MINERALS.

From twenty to thirty inches of bituminous coal is found in the eastern part of the county. Building stone in great abundance is found in all parts of the county.

CULTIVATED LANDS AND PRICE OF LANDS.

About two-thirds of the area of Jackson county is in a high state of cultivation. Lands are worth from five to fifty dollars per acre, according to quality, improvements and location, and almost any one can get land in quantity to suit their means.

PRODUCTS.

The principal products are corn, wheat, oats, rye, clover, timothy, blue grass, potatoes, cabbage and tobacco; cattle, horses, mules, sheep and hogs, and all fruit and vegetables common to the latitude.

RAILROADS.

Jackson county has superb railroad facilities, having two roads that run through the county the entire distance from east to west, and one from the northwest to southeast, besides ten others coming into Kansas City from all directions, thus furnishing a ready and quick market for everything a man can raise from a pound of wheat straw to a car-load of cattle.

JASPER COUNTY.

Population, 32,121. Jasper county comprises that part of Southwest Missouri bordering on Kansas, cornering with the Indian Territory and the third county north of the Arkansas State line; was organized in the year 1849, has an area of 637½ square miles, and contains 419,319.21 acres of land. Spring river divides the county into two natural divisions: north of the river, agricultural and stock-raising predominate; south of the river, mining predominates.

The mines of Jasper county are confined to this southern division, except the coal mines in the northwestern part.

All the northern division, and the larger portion of the southern division, are susceptible of a high state of cultivation. The northern division is mostly prairie; the southern division is largely timbered.

Timbered lands comprise about one-fourth the area of the county. The varieties comprise all those usually found in this latitute, the principal of which are the different kinds of oak, hickory, walnut, ash, elm, maple, mulberry, cherry, sycamore, birch and red bud.

The principal nut and wild fruit producing trees are hickory, oak, walnut, pecan, chinquapin, cherry, mulberry, persimmon, pawpaw, plum, haw and hazel. These are dropped every year, and help to furnish the mast which is so abundant.

PRICES OF LANDS.

There are now in Jasper county 20,000 acres of mineral lands undeveloped, upon which there are constantly new discoveries of ore, and over 200,000 acres of unimproved lands mostly of good quality and susceptible of a high state of cultivation, and upon which a great number of people can secure healthy and prosperous homes or paying mines, at prices ranging from five to ten dollars per acre. Good farms, with good to medium and cheap improvements, can be had at prices from twelve and one-half to twenty-five dollars per acre.

Coal of good quality is mined in the northwestern and western parts of the county, and is sold and delivered in the cities at from ten to twelve and a half cents per bushel. It is also brought here by railroad a distance of from ten to twenty-five miles, and sold at the same price. Cheap fuel is thus permanently assured, timber being plenty and increasing in abundance towards the south of Jasper county; good solid cord wood is delivered here at two dollars and fifty cents per cord.

STONE AND BUILDING MATERIAL.

Limestone is the bed rock of Jasper county, generally lying deep, but cropping out from some of the ravines and from the sides of some of the bluffs. This limestone makes a good quality of lime. Sandstone, or freestone, quarries are numerous in the northwest corner of the county. Hornstone is found in places in the top soil; is of a very light, porous character, and has many valuable properties. These varieties of stone furnish excellent building material.

The soils of Jasper county comprise bottom, a rich, deep, alluvial soil; second bottom, a rich, deep, alluvial, bordering on the red or mulatto soil; upland soil, which grades through all shades of black, grey and red. The latter is the celebrated mulatto soil for which Southwest Missouri is particularly noted, and is so highly prized wherever known.

The soils are underlaid with what is known as the red belt, containing the porous hornstone, rich in oxide of iron, oxide of calcium, phosphorus and animal and vegetable deposits, which together act on the soil as perpetual fertilizers. This red subsoil, brought from a depth of twenty or thirty feet, will sprout vegetation like a hot bed.

The soils of Jasper county are noted as favorable to the production of every staple grown in the Northern States, as well as some of the leading productions of the Southern States, such as cotton, tobacco, peanuts, barley, hemp, flax, castor beans and field peas.

Good water, clear, pure and healthful, is found everywhere in Jasper county. It is easily obtained by digging at from fifteen to thirty feet.

Excellent springs and streams of clear, pure water are well distributed over the county and make up the water courses which flow from east westerly for some distance nearly parallel with each other until received into the main central artery of the county.

Spring river, a beautiful, clear, rapid stream of spring water, not subject to overflow, and capable of operating mills and factories of the largest machinery.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	75,000	42 bushels.
Cultivated in wheat	40,000	20 bushels.
Cultivated in oats	6,000	25 bushels.
Cultivated in hemp	350	
Cultivated in flax	6,500	
Cultivated in sorghum	1,000	
Cultivated in tobacco	300	
Cultivated in timothy and clover	400	
Cultivated in vineyards	1,000	

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	75,000	7 bushels.
Cultivated in wheat	55,000	12 bushels.
Cultivated in oats	6,000	20 bushels.
Cultivated in flax	500	
Cultivated in hemp	300	
Cultivated in tobacco	300	
Cultivated in apples	3,000	

Remarks.

Drouth and chinch bugs have been terribly severe.

JEFFERSON COUNTY.

Population, 18,736. This county is bounded on the east, for a distance of twenty-three miles, by the Mississippi river; on the north, for twenty- four miles, by the Meramec river, and for a distance of twelve miles by the county of St. Louis; on the west by Franklin and Washington counties, for a distance of twenty-four miles, and by Big river, for a distance of ten miles; and on the south by St. Francois county, for a distance of eleven miles, and by Ste. Genevieve county, for a distance of nine miles. A spur of the Ozark range of mountains runs diagonally through the county from the south line to the northeast corner on the Meramec river, from which point there is a continuous ridge to the southwest corner of the State, across which no water runs. The county contains 404,000 acres of land.

SOILS.

It is estimated that about three-fourths of Jefferson county is arable land, the balance being so broken or rocky that it is unfit for cultivation, but produces abundance of pasture grasses, and especially blue grass. The ridges of high lands lying between the water courses named, extend in width from a few yards to miles, and the soil at the surface is a light sandy loam, with a deep subsoil of clay, intermixed with sand, underlaid by magnesian limestone at a depth of fifteen to twenty feet. The valleys or lowlands lying along the streams named and other smaller streams, have a very deep black loam, which is practicably inexhaustible by tillage.

PRODUCTS OF THE SOIL.

Wheat, oats, corn, hay, clover, Irish and sweet potatoes, tobacco, broom corn and sorghum, are the chief productions of the county. The ridges are deemed the best wheat land and the valleys the best corn land. The average yield of wheat is fifteen bushels, and of corn about thirty bushels per acre, though by careful cultivation the yield of corn often reaches seventy-five bushels per acre, and of wheat thirty bushels, and in some instances over forty. Peaches, apples, grapes, strawberries, gooseberries, blackberries, raspberries and cur-

rants, are produced in great abundance for home consumption and market. The hill lands are peculiarly well adapted to the production of all kinds of fruit.

MARKETS, RAILROADS AND BUSINESS FACILITIES.

The principal home markets for the products of the farm and shop are Crystal City and De Soto. The former has a population of 1,500 and the latter 2,500. There are many towns in the county of minor importance, such as Kimmswick, Sulphur Springs, Pevely, Horine, Bailey's Station, Hematite, Victoria, Vineland, Hillsboro, Byrnesville, Antonia, House's Springs, Morse's Mills, Maxville and Avoca. The Missouri Pacific Railway runs for many miles along the northern and northwestern border of the county, and many of the people find markets along that road and reach St. Louis by it. The Iron Mountain Railroad runs thirty miles through the county, and affords a way to business and market for a large portion of the population. As has been stated, the Mississippi river washes about twenty-three miles of the border, and hence many of our people have a water way to market north and south.

Crop Report.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	26,667	30 bushels.
Cultivated in wheat	26,667	15 bushels.
Cultivated in oats	5,000	26 bushels.
Cultivated in sorghum	500	
Cultivated in tobacco	160	
Cultivated in timothy and clover	16,000	1½ tons.
Cultivated in vineyards	5,000	

JOHNSON COUNTY.

Population, 28,177. Johnson county lies in the Lamine River Valley, about equally distant from the north and south boundaries of the State, and in the second tier of counties from the western boundary line, distant from St. Louis about two hundred miles. It is bounded on the north by Lafayette county, on the east by Pettis county, on the south by Henry county, and on the west by Cass and Jackson counties.

The county contains 522,049 acres, exclusive of town lots, of which there are 3,468 in the county. The surface of the county is gently undulating prairie lands mainly, though traversed by numerous well-timbered streams.

PRICE OF LANDS.

Good farm lands, in cultivation, with fences, houses and outbuildings, can be bought at from fifteen to twenty dollars per acre. Wild lands at from five to eight dollars per acre. Farms in a fine state of cultivation, with all necessary buildings, outhouses, barns, orchards etc., at from twenty to thirty dollars per acre, according to proximity to towns and railroad depots.

SOIL AND PRODUCTS.

The soil is generally a rich black loam, underlaid with limestone producing abundantly under proper cultivation. In the vicinity of Warrensburg, the county seat, the soil is somewhat lighter, underlaid with sandstone, well adapted to grapes and fruits of all kinds.

The prairie soil produces fine and abundant crops of wheat, corn, rye, oats, barley and grasses; while the upland timbered portions are well adapted to wheat and fruits. In all parts of the county the raising of small grains and Indian corn receives the greater part of the attention of the inhabitants, though in the southern and southeastern parts considerable attention has been paid to the raising of blooded stock, with fair results as shown below. In one township there is not a single bull that is not of good pedigree. At one shipment made from this township in March, 1880, of thirty-one head of cattle, twenty-six three-year-old steers averaged 2,000 pounds each, and five spayed heifers of the same age averaged 1,710 pounds each.

KNOX COUNTY.

Population, 13,047. Knox county is situated in northeast Missouri, in he midst of a fertile blue grass country. Its eastern border is twenty-ve mile west of the Mississippi river, and its northern boundary line about the same distance from the Iowa State line. It is bounded on e east by Clark and Lewis counties, and the south by Shelby and acon, west by Macon and Adair, and on the north by Scotland.

TIMBER AND WATER SUPPLY.

The county is traversed by creeks and rivers flowing in a south-sterly direction into the Mississippi river. Along the banks of the reams are found all varieties of oak, hickory, walnut, maple, wild erry, linn and other forest timber peculiar to the latitude. Dwarf mber, consisting of hazel, crabapple, white thorn and plum are met ith on the rising ground.

SURFACE AND PRODUCTIONS.

The principal portion of the surface of the county is undulating rairie, unsurpassed in fertility and general productiveness. Fruits nd vegetables of all kinds succeed remarkably well, and in average ereal production Knox county is second to none.

RAILROAD FACILITIES.

The Quincy, Missouri and Pacific Railroad passes from east to west hrough this county. The Keokuk and Kansas City line is in process f rapid completion. The county will then possess the advantages of ilroad competition.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per ac
Cultivated in corn	140,000	30 bushels.
Cultivated in wheat	50,000	15 bushels.
Cultivated in oats	80,000	35 bushels.
Cultivated in flax	1,000	12 bushels
Cultivated in sorghum	1,000	250 gallons
Cultivated in tobacco	2,000	1,200 poun
Cultivated in thimothy and clover	25,000	

1881.

Articles.	No. of acres.	Yield per a
Cultivated in corn	15,000	25 bushels
Cultivated in wheat	55,000	12 bushels
Cultivated in oats	75,000	35 bushels
Cultivated in flax	1,000	8 bushels
Cultivated in sorghum	1,200	
Cultivated in tobacco	1,500	

LACLEDE COUNTY.

Population, 11,524. This county is situated in the south centr part of Missouri. It contains about 474,879.28 acres of land. It is o of the best watered counties in the State, and is amply supplied wi timber for fuel and building purposes.

THE LANDS.

There were assessed for taxation in 1879, 356,991 acres of land in this county. Of these taxed lands 82,727.71 acres belong to the St. Louis and San Francisco Railway Company, leaving 274,264.29 acres that belong to private individuals. These lands are scattered through every township in the county.

CHARACTER OF TAXED LANDS.

Of these lands, about one-half are open and the other half timbered. Exclusive of railroad lands, about one-third are in cultivation. The bottom and valley lands along the streams are very rich and productive, and are skirted by rolling prairies or table lands, and abound in fine timber of the choicest varieties. From the sources of these streams to their mouths are found choice farms, well improved and stocked. The improved uplands are of good quality and productive, producing all the agricultural staples; have proven superior for the growth and quality of tobacco, the tame grasses, fruits and grapes. As a general rule, every upland farm has an abundance of wood land attached, and is well supplied with water.

PRICE OF LANDS AND PRODUCTIONS.

The improved bottom and valley lands sell at from five to twenty dollars per acre, according to location and improvements; the improved uplands from two dollars and fifty cents to ten dollars per acre, according to location and improvements, both including the wood lands attached. The railroad lands are held at low figures, and will be sold on accommodating terms. The unimproved land will bear comparison with the improved taxed lands in natural quality and location.

The principal productions are wheat, corn, oats, sorghum, tobacco, hay and potatoes. The average productions per acre on the bottom and valley lands are: Wheat, twenty bushels; corn, fifty bushels; oats, fifty bushels; sorghum, two hundred to two hundred and fifty gallons; hay, two tons, and potatoes, one hundred and fifty bushels; and on the uplands but a small percentage less, and of tobacco, seven hundred pounds per acre.

TRANSPORTATION.

The St. Louis and San Francisco Railway passes through the county from northeast to southwest, a distance of more than thirty-six miles.

Its taxable wealth in the county is $306,642. The stations of Stoutland, on the line of Camden county, and Phillipsburg and Conway in the southwest of the county are all points of considerable trade and do a good shipping business.

Crop Report.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	24,000	10 bushels.
Cultivated in wheat	12,000	6 bushels.
Cultivated in oats	6,000	10 bushels.

Remarks.

"On all the uplands corn is almost an entire failure on account of drouth and chinch bugs. Rich bottom and valley lands will yield from twenty to forty bushels per acre. No fruit of any kind. But little flax, hemp or tobacco cultivated."

LAFAYETTE COUNTY.

Population, 25,731. Lafayette county is situated in the western part of the State of Missouri. It is bounded on the north by the Missouri river; on the south by Johnson county; on the west by Jackson county, and on the east by Saline county.

SURFACE AND SOIL.

Its general surface is high and rolling, about three-fourths being prairie and one-fourth timber. A high ridge passes south of its center, separating the tributaries of the Missouri from those of the Lamine. Many streams throughout the county afford an abundance of stock

water. Along these streams are found fine groves of timber, such as walnut, oak, hickory, elm, ash, cottonwood, linn, poplar, maple, etc. The soil is a deep, rich black loam, in many places four or five feet deep, never less than two or three feet deep unless it is washed. It is underlaid with limestone, and is unsurpassed by any agricultural country on earth for fertility and production of a large variety of products.

LAND—PRICES AND PRODUCTIONS.

The county contains 315,000 acres of improved lands, and 60,000 acres of wood land, besides 18,000 acres of other unimproved lands. The average price of improved land is about twenty-five dollars per acre; of unimproved land, from five to twelve dollars and fifty cents per acre. The commodities for export are mainly wheat, corn, hemp, tobacco, cattle and hogs. The average yield of corn is about fifty-five bushels, and of wheat from fifteen to forty bushels per acre.

TRANSPORTATION FACILITIES.

The Missouri river washes fifty miles of one side of the county, affording drainage and water transportation. The Missouri Pacific Railway has twenty-eight and one-fourth miles of track in the county; the Chicago and Alton Railroad thirty-seven miles, and the Kansas City and Eastern fourteen miles, thus giving to the county every facility for transportation which could be desired.

LAWRENCE COUNTY.

Population, 17,585. Lawrence county is situated in the southwest part of the State, west of Springfield, and contains 625 square miles, or 389,681 acres, of which 379,848 acres are assessed for taxation, leaving 9,833 acres unaccounted for. The average assessed value is 3.74 11-100 dollars per acre. The total assessed valuation for 1879 was $2,600,000.

SURFACE, CHARACTERISTICS AND SOIL.

The land is about equally divided between timber and prairie. In ordinary seasons it is all very productive. The soil varies in quality, but all is valuable. The uneven and unsubdued portion is valuable for pasturage, containing a wild growth of grass, known as prairie grass, on which many cattle range, and much goes to waste.

PRICES OF LAND, AND PRODUCTIONS.

The uncultivated portion of the lands are generally owned by non-resident land speculators and the St. Louis and San Francisco Railway Company, and can be bought at reasonable rates, from two dollars and fifty cents to eight dollars per acre, on long time at a low rate of interest. The agricultural productions are wheat, corn, tobacco, oats, rye, barley, peas, beans, flax, potatoes, sorghum, grapes and vegetables of almost every variety grown in the United States. Timothy, blue and orchard grass, red clover, red top and all other tame grasses grow well. Apples, peaches, plums, pears, cherries, and all manner of berries, are of the finest flavor.

The land in Lawrence county produces on an average fifty bushels of corn, eighteen or twenty of wheat, and forty bushels of oats to the acre. All other grain grown in a climate like this, grows equally as well here.

MINERAL RESOURCES.

Fair prospects for paying mines have been found in different parts of the county. Near Aurora, a station on the St. Louis and San Francisco Railway, in section six, township twenty-six, range twenty-five, sixteen thousand pounds were taken out of a shaft fifty feet deep. Struck mineral at eleven feet, largest piece weighing eighteen pounds found at a depth of sixteen feet. Mineral ranges northeast and southwest.

CROP REPORTS.

No estimate furnished by correspondent of number of acres in cultivation of the various cereals.

Wheat per acre	11 bushels.
Oats per acre	30 bushels.
Corn per acre	20 bushels.

Remarks.

"Owing to drouth and chinch bugs, the crop of corn will be the ghtest ever known here. Wheat yielded about three-fifths of crop of 880; oats, light acreage but fair yield. Wheat damaged by rust and hinch bugs."

LEWIS COUNTY.

Population, 15,925. Lewis county is in the northeast part of the tate, on the Mississippi river, and separated from the State of Iowa y Clark county. It was organized on the second day of January, A. .1833, and named in honor of Captain Merriwether Lewis, the first merican Governor of Louisiana, and who, with Lieutenant Clark, st traced the Missouri river to the source, crossed the Rocky Mountains, and descended the Columbia river to its mouth.

AREA, SURFACE, SOIL AND PRODUCTIONS.

Lewis county has a river front of some twenty-three miles, and tends back therefrom twenty-four miles. It contains about 501.5 uare miles, or over 321,000 acres, of which one-half is fertile prairie, d the balance timber, the latter for the most part skirting the streams, which the principal are the Wyaconda, North and Middle Trabius, ith Sugar, Durgain, Grassy and Troublesome creeks as tributaries. ese generally flow in a southeasterly direction, and furnish an undance of water at all seasons.

The soil is generally fertile and well adapted to the growth of rn, wheat, rye, oats, timothy and blue grass, the latter growing here readily and with as much luxuriance as in the far-famed "blue ass regions" of Kentucky. The yield of corn is very prolific, and favored sections wheat reached as high as thirty bushels per acre in 79. The average yield of oats is from twenty to forty-five bushels er acre. Of late years, considerable attention has been given to mothy, and during the last season not less than 20,000 bales were ipped at the single port of Canton.

LINCOLN COUNTY.

Population, 17,443. Lincoln county is situated on the Mississippi river, and is the second one above St. Louis. It is nearly square in shape, its greatest length being twenty-nine miles east and west, and its greatest breadth twenty-four north and south. It has an area of 620 square mile, or 396,148 acres. The thirty-ninth degree of latitude passes through its center, and its isothermal line in fifty-six.

TOPOGRAPHICAL FEATURES.

The topography presents but very few striking features. Along the Mississippi river is a bottom prairie two or three miles wide. This is bounded on the west by rock bluffs which vary from fifty to two thousand feet in elevation. These bluffs are cut in many places by narrow valleys through which flow the streams that fall east of the dividing ridge. This main ridge is nearly parallel to the Mississippi river, from eight to twelve miles distant and nearly as far from Cuivre river on its west. The eastern half of the county has an uneven surface, with ridges rising in places more than a hundred feet above the adjacent valleys, generally parallel to the dividing ridge, and in the northeast is a ridge of knobs running north and south, and from four to five hundred feet high. From many points the prospect is very beautiful. The western half of the county is mostly high rolling prairie, cut through in many places by the Sulphur, North, West and Eagle Forks of Cuivre river and their tributaries, bordered by heavily timbered land. The prairie land comprises about one-third of the area of the county.

SOILS AND PRODUCTIVENESS.

The soil of Lincoln county is varied in kind and quality. In quality it ranges from poor to extremely rich. Yet while none is too rich for careful and thorough cultivation not to pay largely over slovenly tilling, so none is too poor to make fair return for labor judiciously bestowed. The prairie soil is tolerably uniform; none of it can be called poor. A small proportion of the prairie land is what is called Crow-foot land, the best upland prairie soil known. It has sufficient sand for the water to drain off rapidly in wet weather, and enough of clay, lime, magnesia and humus to retain moisture. Four-fifths of the

prairie is of the kind known as Resin weed land, possessing less sand and more clay than the Crowfoot land, and like it based upon silicious marl, which insures, with proper cultivation, practically unlimited durability. While inferior in quality and scope to the Crowfoot land it is of great fertility, and in favorable seasons, and with proper cultivation, will produce from fifty to seventy-five bushels of corn, forty to sixty bushels of oats, twenty-five to thirty-five bushels of wheat, and two to three tons of grass per acre. With the average season and the various grades of tillage in vogue among our farmers, good, fair to middling, and bad, the general averages will reach about half the above estimates. The bottom prairies have a very rich and inexhaustible soil. Lying mostly on the Mississippi river, by reason of its occasional overflow, which has occurred about every ten years, and of insufficient drainage, most of these lands are yet uncultivated.

TRANSPORTATION FACILITIES.

The transportation facilities have heretofore been convenient only to the eastern and southeastern parts of the county. The Mississippi river bounds the county for twenty-three miles; Cuivre on the south is navigable as far as Chain of Rocks. A few miles from the southern line of the county runs the Wabash, St. Louis and Pacific Railway. The Keokuk and St. Louis Railroad, completed in September, runs through the county, three or four miles from and parallel with the Mississippi river. The St. Louis, Hannibal and Keokuk Railroad is graded through the center of the county from north to south. It is finished to the northern line of the county, and the directory claim that the entire road will be completed inside of six months. A branch from this will run west to connect with the coal mines in the southwestern part of the county. No point in the county will then be more than twelve miles from railroad communication. By these two roads the southern line of the county is only forty miles from St. Louis.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	84,912	10 bushels.
Cultivated in wheat	67,928	10 bushels.
Cultivated in oats	42,456	25 bushels.

LINN COUNTY.

Population, 20,016. Linn county is in the exact center of the State, east and west; her north boundary is forty miles south of the Iowa State line, and her south boundary twenty miles north of the Missouri river.

The county is nearly square in form, and contains six hundred and forty-eight square miles. Seventy-five per cent. of her lands consist of beautiful undulating prairies, and the residue of timbered valleys and rolling timbered land.

SURFACE CHARACTERISTICS.

The topography of the country presents a scene of beauty and rural loveliness unsurpassed in any country. There are eight running streams, which, with their tributaries, cross the county from north to south, furnishing an abundant and convenient supply of water for stock; and all along these streams are fine timber belts, from one-fourth of a mile to one and a half miles in width, affording plenty of timber for fire, fencing and other uses. The intervals between the streams, varying in distance from one to four miles, consist of beautiful, wave-like prairies just sufficiently rolling to give good drainage.

There are occasional springs of excellent water, and an abundance of the finest water for drinking, washing and culinary purposes can be found in any portion of the county at a depth of from twelve to thirty feet.

The surface soil, generally, consists of a splendid black vegetable mould, varying in thickness from eight inches to two feet, easy of cultivation and of the greatest fertility; and this surface soil is underlaid with a subsoil varying from six or eight to thirty feet in thickness, and is largely composed of the carbonates and phosphates of lime and other fertilizing qualities, which furnish us a soil absolutely imperishable and inexhaustible. This subsoil when thrown to the surface, soon under the influence of heat and cold, rain and sunshine, slacks like an ash heap, and is unsurpassed in its producing qualities. In the entire county there is little land, indeed, that cannot be utilized as either agricultural or grazing lands.

RAILROADS.

Running through the county from east to west is the old reliable Hannibal and St. Joseph Railroad, giving direct communication with

the Mississippi river at Hannibal and Quincy, and connecting with the great net-work of railroads diverging from those points south, east and north; and to the west with the Missouri river, and with the great system of railroads diverging from Kansas City and St. Joseph. She also has the Burlington and Southwestern Railroad, crossing the county from north to south. This important road is already completed from Burlington, Iowa, to Laclede, in this county, and will, most likely, be speedily completed twelve miles further south, so as to connect with the St. Louis and Omaha Railroad at Cunningham, in Chariton county, thus giving direct communication with Chicago and St. Louis.

PRICE OF LANDS.

Unimproved lands, from medium to the finest quality, can be had at from three to ten dollars per acre, depending on location and advantages; and good improved farms, with comfortable houses, barns and orchards, can be had at prices varying from seven to twenty dollars per acre. Persons desiring good stock farms of from 300 to 15,000 acres in a body, can be most admirably suited in this county.

CROP REPORT.

1860.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	49,000	30 bushels.
Cultivated in wheat	15,000	15 bushels.
Cultivated in oats	25,000	40 bushels.
Cultivated in sorghum	500	150 gallons.
Cultivated in tobacco		1,000 lbs.
Cultivated in timothy and clover	50,000	1¼ tons.

LIVINGSTON COUNTY.

Population, 20,205. Livingston county, one of the most central counties of the State, was formerly a part of Chariton and Carroll counties, but the boundaries were fixed in 1837, and the county named in honor of Edward Livingston, Secretary of State under President Jackson.

TOPOGRAPHY, CLIMATE AND SOIL—MINERALS.

Livingston county is the heart of the Grand River Valley; it lies in the center from north to south of the great middle belt of the Union, a strip of country about four hundred miles wide, reaching from ocean to ocean, wherein the agriculture, stock, fruit and dairy husbandry, commerce, moral and intellectual culture, railway life and population have reached their highest development. The great commercial and railway centers, the finest fruits and the strongest, densest population of the American continent is found in this belt.

FRUIT CULTURE.

Fruit-growing is a great success here; especially apples; some varieties, particularly Rawles' Janette, Ben. Davis and winter Pearmain, excel the same varieties that are grown in the East. Pears of some varieties never fail. Peaches do well if not killed by late frosts. Cherries of hardy varieties never fail. The grape, lately introduced in the country, surpasses all expectations and its culture is largely on the increase, and this country may be made as famous for grapes as Alsace, Lorraine and Baden, the loess of the subsoil forming a splendid basis for this industry. Small garden fruits, such as currants, gooseberries, strawberries and raspberries, do well.

PRINCIPAL TOWNS AND SHIPPING FACILITIES.

Chillicothe, the county seat of Livingston county, is destined to be the great railroad center of North Missouri. The old reliable Hannibal and St. Joseph Railroad runs through it nearly on an east and west line. The Wabash, St. Louis and Pacific Railway is completed, and passes through Chillicothe, and is the shortest route from Omaha to St. Louis by seventy miles. A survey is now progressing for the exten-

sion to the Chicago and Burlington Railroad to Kansas City. One of the surveys passes through Chillicothe, and is by far the shortest and best route. Chillicothe would be a fine feeder for Chicago freight. The Chillicothe and Des Moines City Railroad is graded and bridged to Trenton, and will be built before many years. With these competing lines of one hundred miles of railroad in this favored county, the producers and traders can command the best markets east, west, north or south, and secure the most favored rates of transportation.

Crop Report.

1880.

Articles.	No. of acres.	Yield per acre.
Cultivated in corn	120,000	25 bushels.
Cultivated in wheat	25,000	10 bushels.
Cultivated in oats	15,000	35 bushels.
Cultivated in flax	1,000	10 bushels.
Cultivated in sorghum	250	
Cultivated in tobacco	450	1,000 pounds.
Cultivated in timothy and clover	60,000	1½ tons.
Cultivated in vineyards	200	8,000 tons.

McDONALD COUNTY.

Population, 7,816. The county of McDonald is the extreme southwestern one in the State of Missouri. It is bounded on the east by Barry county, on the north by Newton, on the south by Benton county, Arkansas, and on the swest by the Cherokee Nation.

PHYSICAL FEATURES.

The surface of the county is diversified, being in places rolling and hilly, with much bottom lands on the creeks and fertile valleys. In the four different corners of the county there are fine areas of prairies,

averaging about a township to each locality. There are also extensive plats of what are called flat wood lands, which are exceedingly fertile.

The county is supplied with a dense growth of timber, consisting of pine, cedar, all the oaks, hickory, walnut, wild cherry, sycamore, ash, etc.

The county is well watered. Springs of the purest water, some of them possessing medicinal qualities, are numerous. There are many beautiful streams traversing the county, furnishing an abundance of stock water, and supplying fine fish and excellent sport to the disciples of Izaac Walton. The water power is good, and to a limited extent has been utilized in the erection of many good saw and grist mills.

THE CLIMATE.

The climate is unsurpassed, the winters being mild and short, stock requiring but little feeding or care.

SOIL AND PRODUCTIONS.

The soil and climate of the county favor the most diversified culture, and herein lies the great advantage which this county offers. The two extremes of northern and southern products, to wit: corn and cotton, are produced in paying quantities. Between these two extremes everything usually grown by farmers can be cultivated profitably. Wheat, oats, tobacco, flax, the tame grasses, castor beans, potatoes and all garden products are profitably raised. With such a diversified production, it will at once be seen that the owner of even a small farm can furnish himself and family with all they materially require, with but little expenditure except his own labor.

FRUITS.

Fruit of all kinds grows luxuriantly and mature in richest flavor. Grapes, both wild and tame, are produced in enormous quantities and of the finest varieties.

EXPORTS.

Wheat, tobacco and fruits—of the latter apples principally—are sold in large quantities for export. Cattle, sheep and hogs are also raised and shipped largely.

Neosho, twenty-two miles distant from Pineville, (the county seat) on the St. Louis and San Francisco Railway, is the principal shipping point for the county.

EDUCATIONAL.

Good school houses are built, and schools maintained in almost every sub-district in the county. The moral tone of the county is good. There is not at this writing a single licensed dramshop in the county.

LAND PRICES.

There are over 100,000 acres of improved and inclosed land in the county. Farms can be purchased at from five to twenty dollars per acre; unimproved lands at from two to ten dollars. Considerable government lands are yet subject to homestead entry. The St. Louis and San Francisco Railway owns near 100,000 acres of land, which is in market, and is being sold cheap and on favorable terms.

MACON COUNTY.

Population, 26,223. The county of Macon forms part of northern Missouri, and is situated between the Mississippi and Missouri rivers, near the center of the State, east and west.

In respect to location, climate and topography, Macon county is fortunate, and should be especially attractive to the immigrant. Bounded by the fair, fertile and highly developed counties of Shelby, Knox, Adair, Sullivan, Linn, Chariton and Randolph, teeming with intelligent, orderly and progressive populations, is, by reason of its surroundings, the center of one of the most attractive districts in the Great Southwest. A dry atmosphere, good natural drainage, and pure water, the great conditions of uniform health and long life, are found to exist here in a remarkable degree. The county is about equally divided between prairie and timber land, and so advantageously located as to render it possible for every farm to contain both prairie and timber—a most important item to note. There is but little waste land in the county, all being susceptible of cultivation or the growth of the various grasses.

TIMBER AND STONE.

All the different varieties of oak, walnut, ash, elm, maple, sycamore, hickory and other woods are abundant. Oak timber finds a ready sale for local manufacturing purposes. Fully 150,000 railway ties are shipped annually. For several years past, quite a large quantity of walnut timber has been shipped to eastern manufactories. White sandstone and blue limestone are abundant in many parts of the county.

PERPETUAL WATER.

The Chariton river, with its tributaries; the numerous and permanent artificial ponds, and splendid wells and cisterns, furnish every portion of the county with an unfailing supply of pure water.

THE SOILS.

The dark soil, with a yellowish subsoil, predominates. All know the productive capacity of the black soil. This subsoil, when exposed to the chemical action of the elements, becomes equally as productive and far more durable than the black alluvial soil; and as a basis for fruits and grasses, and, in fact, for every variety of vegetable production grown in this latitude, is remarkably rich, versatile and lasting.

TRANSPORTATIONS AND MARKETS.

The railroad facilities in the county are quite extensive, and afford the means of easy access to all the best markets by rapid transit. The Hannibal and St. Joseph Railroad and the Wabash, St. Louis and Pacific Railway, each transverse the county centrally from east to west and from south to north, crossing each other at Macon City, the county seat.

CHEAP LANDS.

Lands are astonishingly cheap in Macon county. Good improved farms can be had for from seven to eighteen dollars per acre. Good farm improvements are daily offered at cost, with the land thrown in. Thousands of eastern men are passing through Missouri to the treeless, cheerless, grasshopper plains of Kansas, to pay more for wild lands than the price asked for rich, fairly improved farms in Macon county,

where timber, perenial grasses, abundant pure water, fruits, a good climate, schools, churches, markets, railways—in a word, where everything that can make life enjoyable awaits the immigrant.

Besides these improved and unimproved lands held by private individuals, for sale at great bargains, and to be had on easy terms, the Hannibal and St. Joseph Railroad has about 50,000 acres on the market at from two to ten dollars per acre.

Terms: One- sixth of the purchase money down, and the balance in six years at six per cent. interest. These lands embrace some finely improved farms that have fallen back to the railroad company by reason of non-payment of the purchase money. Energetic men could easily pay for these farms with the proceeds of two average crops.

Crop Report.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	100,000	20 bushels.
Cultivated in wheat	15,000	15 bushels.
Cultivated in oats	80,000	20 bushels.

Remarks.

No estimate for 1881 of acreage or yield of crop furnished by correspondent, but remarks as follows:

"There is one-fourth crop apples; will be 1,000,000 pounds tobacco; corn, half crop; oats, two-thirds crop and good weight.

"Chinch bugs worse than ever known; drouth and heat terrible; hay, full crop, but damaged by rain whilst cutting; sorghum, fourth of a crop; half crop of Hungarian and millet."

MONITEAU COUNTY.

Population, 14,347. Moniteau county, lying in the exact center of the State, is one of the favored portions of the greatly favored commonwealth of Missouri.

Its civilized history reaches back to the day when Daniel Boone loved to roam over its diversified hills and plains, drinking from its crystal springs, in pursuit of the game which once abounded here.

The Moniteau, Moreau, and Petite Saline creeks are relics of the early French nomenclature, and these, and their tributaries, furnish fine drainage, and everlasting stock water for almost every neighborhood in the county.

PHYSICAL FEATURES AND PRODUCTIONS.

The southern and western portions of the county consist mostly of gently undulating prairies, with a rich vegetable mould soil, very pleasant to cultivate, and yielding, in abundance, all the ordinary crops of the western country, particularly the cereals. The north and east have ranges of heavily timbered hills, the timber being principally of the best varieties of oak, interspersed with the usual varied timbers common to the west. Along the streams are fertile valleys, which often spread out into very wide bottoms, than which there is no better land in America.

The hills are well adapted to wheat and grasses, and almost unequaled for the very fine quality of tobacco produced.

PRICE OF LANDS.

The prices of valuable lands are higher than in counties more hilly and less fertile; but they are still so low as to give pleasant homes for an astonishingly small sum to those who bring a little ready money from the older States.

The very best improved lands, near railroad stations, with fair houses, barns and fences, can now be bought at from fifteen to twenty dollars per acre, less than half what they actually sold for, in flush times, just after the war.

Several miles away from railroad stations, well improved farms can be bought at about ten dollars per acre; unimproved lands rate at about half the above prices. Some hilly lands, well adapted to sheep

farms, but not all fit for cultivation, can be bought from two to five dollars per acre, and these lands are often clothed with valuable timber.

The county contains four hundred and twenty-one square miles, and two hundred and fifty-seven thousand seven hundred and twenty-one acres of land.

TRANSPORTATION FACILITIES.

The Missouri river forms the boundary line of all the north, and half of the eastern, part of the county, affording unusual facilities for cheap transportation during nine months of the year. The Missouri Pacific Railroad passes almost through the center of the county, from east to west, and the Boonville and Southern Railroad crosses, from north to south, through the western portion.

MADISON COUNTY.

Population, 8,860. Madison county is situated in the southeastern portion of the State, one hundred miles south of St. Louis, on the St. Louis, Iron Mountain and Southern Railway—bounded north by St. Francois county, east by Perry and Bollinger, south by Bollinger and Wayne and west by Iron county, and contains 295,550 acres.

The population in 1820 was 2,047; in 1830, 2,371; in 1840, 3,395; in 1850, 6,003; in 1860, 5,664; in 1870, 5,849.

PHYSICAL FEATURES.

The surface of the county is very rough and broken, with granite and porphyry hills, some of which rise to a height of seven hundred feet above the level of the St. Francois river. These are often narrow, irregular and precipitous, some of them, as it were, forming vast pyramids, from the summits of which a view of the county is grand beyond description; the mountains seem to hide from view the valleys beneath; the eye seems to rest on nothing but a succession of mountains, having a blueish cast. The productive lands may be divided into three classes: First, the table lands which are not as elevated as the por-

pyritic mountains. They are not rich as to soil, but unsurpassed for orchards and vineyards, being above the fogs and frosts. Second, are uplands or "second bottom," which have a clay foundation above the overflow, and are esteemed as most valuable lands. The soil along the streams is mostly of a sandy loam, and quite productive, but subject to overflows. Timber of many varieties may be found in Madison county, such as black and white walnut, white, black, red, Spanish, post and burr oak, black jack, black and sweet gum, soft and hard maple, wild cherry and hackberry, white and red hickory, yellow and pitch pine, red cedar, redbud, birch, hornbeam, sassafras, paw-paw, sycamore, white and red elm, linn, sumac—in fact, endless varieties of shrubs. When this county was first settled, the pine forests were unsurpassed. The table land had comparatively no timber, but was covered with the finest grass, which gave sustenance to wild and domestic animals in winter and summer. The creek and river bottoms were covered with cane brakes. The vast forests of pine have been culled and used for lumber and charcoal, yet the whole surface at this time (except the portion in cultivation) is well set with young timber which, if taken care of, will, at no distant period, be valuable. There are evidently more cord feet of timber on the lands at this time than existed at any former period. The Castor river, on the eastern border of the county, runs in a southern direction through the entire length, and loses itself in the swamp counties. It is a beautiful stream of pure water, fed by living springs and small tributaries, such as Dry and Grounds' creeks, and Whitener's Branch, from the east; Kelley's, Mouser's, Big and Shutley's creeks, from the west. The St. Francois river has its source in St. Francois county.

PRICE OF LANDS, ETC.

The census of 1870 gives 18,298 acres of improved land; 62,839 acres of wood land, besides 1,790 acres of other unimproved land. The price of land is variable, according to location, quality, etc., but is very cheap. Unimproved farming lands can be bought for from one to eight dollars per acre, and improved farms for from five to forty dollars per acre, according to character of land, improvements and location. There are quite a number of small farms, consisting of from sixty to two hundred acres of land, with from twenty-five to one hundred acres in cultivation, surrounded with good pasturing and timber lands, which could be bought for from five hundred to two thousand dollars. Also some very large tracts of unimproved lands, which can be bought very reasonable. Lands known as mineral land vary greatly in price, according to proximity to paying mines and the looks of the prospects at the surface.

Crop Report.

1880

Articles.	No. of acres.	Yield per acre
Cultivated in corn	15,461	49 bushels.
Cultivated in wheat	30,922	18 bushels.
Cultivated in oats	2,000	30 bushels.
Cultivated in timothy and clover	19,462	1 ton.

MARION COUNTY.

Population, 24,837. Marion county has an area of 434 square miles, embracing 277,760 acres of magnificent lands, and having a Mississippi river front ot thirty miles. The river is crossed by two magnificent iron railroad bridges—one of which, in the northern part of the county, being over one mile in length, and the other, at Hannibal, in the southern part of the county, the center of six railway lines, including two main trunk roads—connecting the Atlantic with the Pacific.

The county lies full in the center of the great middle belt of the Union, reaching from ocean to ocean, which composes the great commercial, financial, railway and manufacturing centers; the great dairy, grazing, grain and fruit districts; the great universities; the finest school systems; the densest and strongest population; the most advanced civilization, and the equable mean of latitude and climate for the American continent.

The topography of Marion county is singularly beautiful, with its river front, partly of bold, rugged bluffs, rising abruptly to a height of one hundred to two hundred and fifty feet, outlined by cliffs, crags and

palisades, and abounding in dells, gorges, canons, glens, grottoes, caverns and ravines, crowned with a wealth of forest, whose drapery of green and crimson and gold lends an indescribable charm to the landscape.

About forty per cent. of the county is open prairie, and the sixty per cent. originally timber is now half in cultivated farms, leaving thirty per cent. of the county in forest, and abounds with the finest springs.

The soil in the bottoms and valleys is a very rich alluvial soil, from three to ten feet deep; is very pliable and easily managed, produces enormously and is practically inexhaustible. The surface soil of the uplands is from one to three feet deep, a dark, rich loam upon the prairies, and in the timber it is of a dark yellow and reddish color, which for production ranks with the best soils in the west.

Underlying this county is the famous and ever fertile loess subsoil, which, by analysis, is found to be identical with the loess deposits of the Rhine and Nile valleys. It absorbs water readily, making a natural drainage, and retains moisture to a remarkable degree. It is known to be among the best soils in the world for grain, grasses and fruits. Deep plowing and thorough cultivation is all that is required to make this land bloom with good farms.

PRICE OF LANDS.

Unimproved lands in this county can be purchased at from five to ten dollars per acre, and improved farms from ten to forty dollars per acre.

CROP REPORTS.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	50,000	40 bushels.
Cultivated in wheat	18,000	20 bushels.
Cultivated in oats	3,000	30 bushels.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	40,000	20 bushels.
Cultivated in wheat	20,000	8 bushels.
Cultivated in oats	2,000	25 bushels.

REMARKS.

Reports from all parts of the county state that corn was withered and dry; the earth parched and covered with chinch bugs.

MERCER COUNTY.

Pupulation, 14,674. Mercer county is a part of the Grand River Valley. This stream falls into the Missouri river, in Chariton county, and thence it and its tributaries extend northward and westward, the country thus drained widening until where it reaches the line of Missouri, it is one hundred miles in width.

The valley, in the fertility of its soil, and in its adaptation to the production of every variety of farm products grown in this latitude, has no superior west of the Mississippi river. Though generally consisting of prairie lands, many of its hills are crowned with forests of the most valuable varieties of timber, including oak, walnut and maple.

The Grand river system consists of three branches, known as the west, the middle and Weldon or east branch of Grand river.

Mercer county is drained by the east or Weldon branch, which passes through the central part of the county, while the middle branch skirts the western border, generally being in the edge of the adjacent county on the west. The county is bounded on the north by Iowa; on the east by Sullivan and Putnam counties; on the south by Grundy, and on the west by Harrison county.

SOIL.

The prairie soil is a black, rich loam. The white oak lands are clay. There are large tracts of what is called elm land, the soil of which is black and very rich, originally covered with a very heavy growth of white and red elm and bass-wood.

THE PRICE OF LAND.

By the Eastern man, about to seek a home in the West, it should be borne in mind that but little, if any, over one-half of Mercer county is under cultivation, and that large tracts of wild land can be bought here at from three to eight dollars per acre; and that improved farms can be bought at from six to ten dollars per acre.

CROP REPORTS.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	50,000	35 bushels.
Cultivated in wheat	10,000	15 bushels.
Cultivated in oats	25,000	50 bushels.
Cultivated in sorghum	1,000	160 gallons.
Cultivated in tobacco	500	1,500 pounds.
Cultivated in timothy and clover	118,000	2 tons.
Cultivated in vineyards	500	500 gallons.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	55,000	17 bushels.
Cultivated in wheat	12,000	10 bushels.
Cultivated in oats	25,000	45 bushels.

REMARKS.

Tobacco, small crop; hay, full crop.

MILLER COUNTY.

Population, 9,807. Miller county occupies a position nearly central in the great State of Missouri, and embraces an area of about 570 square miles. Its surface, in elevation, varies from forty to six hundred feet above the level of the Missouri river at the Osage river—the lowest portions being in the valleys of the latter stream and the northwestern and southwestern townships. Near the Osage and its largest tributaries the country is generally broken, excepting immediately in the valleys; but further back, slopes usually become more gentle, until we reach the higher districts, more remote from streams, where the surface is comparatively level, or but slightly undulating.

SOIL.

In the valleys of all streams in Miller county there is a rich, alluvial soil, unsurpassed in fertility by any in the State. In the higher districts there are areas, of considerable extent, of fine, arable land, especially in the northwestern and southeastern townships.

The former embraces Saline and Franklin townships, and the latter what is known as Big and Little Richwoods. In both of these the soil is of excellent quality, and the growth of timber much larger than in the surrounding country. They by no means embrace all the good lands in the county. In the scope of country about Mount Pleasant and Rocky Mount, on the divide of the waters flowing north to the Moreau and south to the Osage, is a fine district of country, well settled and improved. Ibernia and Brumly, two thriving villages in the southeastern and southern portions of Miller county, are well supported by the thrifty farmers in those localities. In various other parts of the county are areas of good lands; and even districts, that are too hilly and rocky for the plow, are admirably adapted to stock grazing and grape culture. In many places along the rocky hill slopes wild native vines, bearing large and better flavored grapes than in any other region, can be found, that scarcely ever fail having a good crop.

The clay in this county is of the best quality to manufacture the red brick. There are numerous beds of pipe-clay and fire-brick.

GRAIN AND PRODUCTS.

Without boasting, Miller county seems as favorably located for the production of all grains and vegetables as almost any other county in the State. Wheat will, on the average, if properly seeded, produce from twenty to thirty bushels to the acre; corn from fifty to eighty; other cereals in proportion. Potatoes will range from one hundred to three hundred bushels to the acre; frequently two crops are produced on the same soil in one year. Corn is often planted on ground after wheat is harvested, producing fifty to sixty bushels of the best corn, before frost.

CLIMATE AND PRICE OF LAND.

The Osage Valley seems to be several degrees warmer in winter than at Jefferson City. When ice is of the thickness of twelve to fifteen inches in the Missouri river, it is never over four to six inches in the Osage.

MISSISSIPPI COUNTY.

Population, 9,270. Mississippi county is situated in 36° 40′ to 37°, opposite the mouth of the Ohio river, and contains 250,000 acres of land, most all of which is susceptible to cultivation, and is a rich, alluvial soil, called, in western parlance, "river bottom"—a soil which rivals in fertility the valleys of the Nile.

TIMBER SUPPLY.

All kinds of timber abound, the predominant growth being cottonwood, black walnut, black and honey locust, white, red, black, over cup, chinquapin and post oak, sugar tree, maple, mulberry, coffeenut, sweet and black gum, persimmon, paw-paw, dogwood, etc.; and upon the water courses are immense "brakes" or groves of cypress, a timber equal to pine for building purposes, and superior to it for out-door work, such as weather-boarding, shingles, fencing, railroad ties and piling. The timber alone, in many instances, will pay for the farm, and there is a fair market for it here and in St. Louis.

SOILS.

Southern Illinois, except a small portion about Cairo, is a hilly country with a cold, clayish soil, and the same might be said of certain sections of Missouri, after passing out of the bottom lands, while here is a warm, rich, sandy soil. A degree of latitude south of most of the Illinois lands, and half that much in altitude, makes the season from two to four weeks earlier than that of Illinois, a matter of vital importance to the gardener and market farmer.

MARKETS AND RAILROADS.

Marketing can be put in St. Louis in nine hours (180 miles) delivered near the markets with little hauling and no transfer of cars, thus enabling fruit or vegetables to go there late in the day and be in market the next morning, while from southern Illinois there is a change of roads, crossing the ferry and hauling in wagons, taking much more time and damaging the article, particularly the softer and delicate fruits.

Southward is the Mississippi river, bordering the county for seventy miles, which never blocks with ice or goes dry below Belmont, with railroads running from Columbus, Ky., (opposite Belmont), to Nashville, Mobile and New Orleans, and all the cotton and sugar-growing States, furnishing a ready market for beef, pork, corn and other productions of the country.

The St. Louis and Iron Mountain Railroad runs through the northern half and center of the county to Belmont, on the Mississippi river, passing through the vast mineral country in the vicinity of Iron Mountain, soon to become a great manufacturing district, which must draw its supplies of provisions, except, perhaps, flour, from the rich lands further south, making a market almost at our own doors.

The Cairo, Arkansas and Texas Railroad runs from Bird's Point, (opposite Cairo), southwesterly through the county, intersecting the Iron Mountain road at Charleston, and extending through to Texas. Thus are secured the very best railroad facilities to the four points of the compass.

PRICE OF LAND.

Lands generally are cheap; unimproved lands from $1 to $5 per acre; good improved farms from $5 to $50 per acre, according to location. Splendid improved farms, within fifteen miles of Charleston, can be bought for from $10 to $20 per acre.

MONROE COUNTY.

Population, 19,075. This county is located in the southern part of Northeast Missouri, and is the center of what is termed the "Blue Grass Region" of Missouri. It is one of the largest counties of the State, containing 422,703 acres, and, in point of wealth, stands among the very first of those counties that have no large cities.

TIMBER AND PRAIRIE LAND.

About two-thirds of the area of the county was originally timber land, and the remainder prairie. The prairies are not very large, and are well distributed over the county, so that not many of the farms of the county, as now owned and occupied, are either wholly prairie or wholly timber. Both the prairie and timber lands yield abundant crops.

TIMBER SUPPLIES.

Of this there is a great abundance and of the best grades—enough to meet all demands for farm and building purposes. The following, among other varieties, are found: Black walnut, common shell-bark, thick shell-bark and pig-nut hickories, white and blue ash, white and black burr, and many other varieties of oak; sugar tree, maple, linn, sycamore, etc., etc. Of the smaller growth there are red and black haws, sumac, hazel, paw-paw, red-bud and many others.

SOIL.

The quality of the soil may almost be gathered from the foregoing. It is of the "bluff" formation, although not so well developed as in some other parts of the country. Professor Swallow, in his geological survey of 1855, says that the "bluff" formation prevails in this county, and that the soil is well adapted to corn, wheat, oats and tobacco. The clay underlying the soil is very productive. Manure is at hand, and the soil can be indefinitely improved by deep plowing and a proper rotation of crops.

WATER.

In all parts of the county there is the greatest abundance of running water. The North, Middle, Elk, and South Fork of Salt river passes through the county from west to east, and they and their tributaries afford good running fresh water throughout the dryest seasons.

CROPS AND GRASSES.

Corn, wheat, oats, tobacco, timothy and blue grass are the great staples of the county. Other crops and grasses are produced, but most attention is given to the above. The corn crop in 1879 made an average of forty bushels to the acre for the entire county. Blue grass grows spontaneously, and Monroe county has as fine blue grass pastures as there are in the world, and a great many of them.

MARKETS.

There are competing lines of railway to Chicago and St. Louis, the best markets in the West.

CHEAP LANDS.

Taking all the facts into consideration, it can be confidently asserted that nowhere can cheaper farming and stock-raising lands be bought than in Monroe county, the prices ranging from ten to twenty dollars for the best improved, and much lower for unimproved lands.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre.
Cultivated in corn	108,000	35 bushels.
Cultivated in wheat	30,000	18 bushels.
Cultivated in oats	25,000	40 bushels.
Cultivated in sorghum	1,500	80 gallons.
Cultivated in tobacco	500	800 pounds.
Cultivated in timothy and clover	160,000	1½ tons.

1881.

Articles.	No. of acres.	Yield per acre.
Cultivated in corn	117,400	7 bushels.
Cultivated in wheat	70,450	7 bushels.
Cultivated in oats	28,350	15 bushels.
Cultivated in rye	1,000	12 bushels.
Cultivated in timothy	88,000	1 ton.

MONTGOMERY COUNTY.

Population, 16,251. Montgomery county is admirably located upon the Missouri river, about seventy miles west of St. Louis, its northeastern boundary being only thirty miles west of the Mississippi. It is bounded on the south by the Missouri river, on the east by Warren and Lincoln counties, on the west by Callaway and Audrain counties and on the north by Audrain county, and has an area of 228,534 acres.

The face of the country is charming. The high, rolling prairie of the northern and central divisions, alternating with beautiful timbered valleys, with the wooded hills, table lands and low-lying valleys and bottoms, and the grand river bluffs of the southern division, together with the numberless glades, intervals, ravines and clear, winding streams, that break the monotony of the woodlands, make up a landscape of loveliness.

The soil of this county is by far its greatest resource. The Missouri river bottoms and minor valleys are covered by rich, dark alluvial, from three to ten feet deep, and ranks with the most productive soils in the world. The prairies and open woodlands have a surface soil of alluvial, from twelve to thirty inches deep, a shade lighter in color and very bountiful.

The subsoil, commonly called clay by the resident farmers, is not at all identical with the heavy, dead clays of the Eastern States and Canadas, but is composed largely of silicious matter, lime and magnesia carbonate; the phosphates, alumina and organic matter, is open and porous, slacks like quicklime on exposure to the frost and air, becomes as flexible as an ash-heap, holds moisture and manures with great tenacity, and will endure great excesses of rain and drouth.

PRICE OF LAND.

Until recently, no effort has been made by the people or State authorities to invite new settlement, capital or enterprise, and the nominal land values of this great region are the natural sequence. Wild lands—timber or prairie—are offered all the way from $4 to $10 per acre, and good improved grain, fruit and stock farms anywhere from $8 to $25 per acre, the price often being less than the first cost of buildings and fences. The only corrective for this unfortunate state of things is immigration—new men, new capital and new enterprise for the development of these latent resources.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	62,000	30 bushels.
Cultivated in wheat	10,000	10 bushels.
Cultivated in oats	40,000	30 bushels.
Cultivated in flax	2,000	6 bushels.
Cultivated in sorghum	1,000	800 gallons.
Cultivated in timothy and clover	30,000	1 ton.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	25,000	5 bushels.
Cultivated in wheat	4,000	5 bushels.
Cultivated in oats	16,000	25 bushels.
Cultivated in flax	4,000	6 bushels.
Cultivated in tobacco	100	

REMARKS.

Wheat in prairie a total failure—in timber half a crop. Dry weather and chinch bugs almost ruined the corn crop. Flax and apple crop very light.

MORGAN COUNTY.

Population, 10,134. This county is located near the center of the State, 160 miles west of St. Louis.

SURFACE CHARACTERISTICS.

The east part and north half is a rich prairie and farming country, well watered by flowing streams, the banks of which are lined by broad strips of timber. The western part of the county is high, rolling prairie, having equal timber advantages. The southern half is a hilly timbered country, containing numerous living streams and springs of most excellent water. The bottoms in this portion of the county are rich, alluvial soil, finely adapted to the cultivation of corn, oats, wheat, rye, barley, potatoes and blue grass. The uplands have a lighter soil but with the aid of fertilizers produce equally as well, and grass grows spontaneously. In this portion of the county thousands of acres are owned by non-residents, unfenced, and afford the finest possible pasture almost through the entire year. Cattle turned upon this range in spring are ready for the butcher in June, and those kept on the range all the year require little additional feed.

AGRICULTURAL RESOURCES.

No county in the State offers greater advantages to the honest, industrious, thrifty immigrant than Morgan. The dull, weary routine of agriculture needs not alone be depended upon for a living; the prairie farms being nearly all contiguous to timber land, the immense range of wild pasture makes stock-raising exceedingly profitable, and it is not an uncommon sight to see some of the largest wheat and corn producers have from 200 to 300 head of cattle ranging on their pastures. Large numbers of horses and mules are annually raised, while fat hogs are marketed from October to June. All kinds of stock find a ready market at the farmer's door.

FRUIT CULTURE.

The climate of Morgan county being mild, large crops of fruit are annually raised. Especially is this true of apples, peaches, cherries, etc.; and France can scarcely excel this for grapes.

TRANSPORTATION FACILITIES.

This county does not lack for transportation. On the south it is washed by the Osage river, navigable a great portion of the year. The Missouri Pacific Railroad passes through it in the northwest, while the Osage Valley and Southern Kansas passes nearly through the center of the county from north to south; and the Jefferson City and Southwestern Railroad, completed recently, passes through the center from east to west. Good public roads traverse the county in all directions, so that almost every farm is in sight of a public road.

PRICE OF LANDS.

The price of unimproved lands ranges from two to five dollars per acre, while improved farms range from five to twenty-five dollars per acre, entirely owing to location and quality of improvements.

The citizens of Morgan county extend a hearty welcome to all enterprising and industrious people to come and settle among them. The winters are short, the summers are long, the climate is delightful and the country is healthy. Post-offices, good schools, churches and mills are convenient to every farm house. Wages are good, and farmers will find a ready market for everything they produce.

CROP REPORTS.

Articles.	No. of acres.	Yield per acre
Cultivated in wheat	8,000	6 bushels.
Cultivated in oats	10,000	20 bushels.
Cultivated in corn	20,000	10 bushels.
Cultivated in flax	7,000	6 bushels.

REMARKS.

Drouth and chinch bugs account for the partial crops.

NEW MADRID COUNTY.

Population, 7,694. New Madrid county is situated on the 36° of north latitude, and 89° 39′ west longitude from Greenwich, or 12° 30′ west of Washington City. It is bounded on the east by the Mississippi river; on the north by Mississippi and Scott counties; on the west by Stoddard and Dunklin counties, and on the south by Pemiscot county. Its surface is level and unbroken, its soil exceedingly fertile, its climate mild and salubrious, and its commercial facilities ample for the cheap and speedy transportation of its surplus products to market.

PHYSICAL FEATURES.

New Madrid county is almost a level plane, sloping gently to the south and west, barely sufficient to carry off the superabundant rain-fall, which is discharged through its water drains into the Mississippi and Little rivers. It possesses, perhaps, as great a variety of soil as any county in the State. Along the Mississippi river, from the city of New Madrid to its southern boundary, a distance of twenty miles, the soil presents the same characteristics as that which mark the borders of the Ohio below the falls. In the interior and northern portion there is bottom, prairie and timber or table lands. The bottom lands may be designated as high bottom and low bottom; the prairie and timber as upland and table land.

SOILS.

These lands present such a great variety of soil, and the different varieties pass into each other by such minute gradations, as to make it almost impossible to point out any marked lines of separation. Along the bank of the Mississippi, above overflow, between the city of New Madrid and the southern boundary of the county, there is found a porous clay sub-soil, over which is spread a vegetable mould, varying in depth from one to five feet. Passing to the interior from the center of this line, the same general characteristics are observable, with the exception of the beds of the dried-up lakes that intervene, until near the eastern line of the "sunk lands" of the Whitewater or Little river, where the soil gradually partakes more of the character of low bottom. The central and northern portion of the county is divided between prairie and high bottom or prairie or table land, whilst the western, and a large area of the northeastern portion is low bottom, subject to annual inundation.

FRUITS AND VEGETABLES.

New Madrid county is well adapted to the growth of many kinds of fruit. Apples, pears, peaches, plums, cherries, and a great variety of smaller fruits and berries, do well; and, where proper care is taken in the choice of varieties and cultivation, fruit of excellent quality and delicious flavor is produced in great abundance. Peaches are almost a never-failing crop, and raspberries, strawberries, currants, blackberries and gooseberries are indigenous and mature early. Grapes, where proper care is taken in pruning and culture, mature finely.

Vegetables in endless variety, and of the most nutritious quality, grow finely in her soil, and her climate imparts to them a rich and mellow flavor.

The commercial advantages of New Madrid county are unsurpassed by those of any county in the State. Her entire eastern front is washed by the Mississippi river, which affords her an uninterrupted channel of communication with the southern market at New Orleans, from which she is distant but a four days' journey by steamboat; and by means of the daily packets plying between St. Louis and ports below, and by boats going up the Ohio river, she has ready access to all the markets north and east.

On her northern border is the Cairo, Arkansas and Texas railroad, a branch of the St. Louis, Iron Mountain and Southern, and crossing her center, from the town of New Madrid west to the interior counties, is the Little River Valley and Arkansas Railroad, now in successful operation. Add to these a well improved system of wagon roads, and it will readily be conceded that ample facilities are possessed for the transportation to market of all the surplus products of the forest, mine, field, farm and manufactory.

Being above the freezing point on the river and below obstructions to navigation, occasioned by low water, with ample inland channels of communication, with the railroads and river, a mild, salubrious and healthful climate, rich and productive soil, an honest and industrious population, New Madrid county offers as great inducements to immigrants as any other county in the State.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	30,000	10 bushels.
Cultivated in wheat	5,000	10 bushels.
Cultivated in oats	500	20 bushels.
Cultivated in cotton	1,000	

REMARKS.

Corn crop damaged three-fourths by drouth; 40 bushels is an average crop.

NEWTON COUNTY.

Population, 18,948. Newton county is situated in the extreme southwestern part of the State, and is bounded on the north by Jasper county; on the west by the State of Kansas; on the south by McDonald county, and on the east by the counties of Lawrence and Barry.

SOILS AND FINANCIAL CONDITION.

Newton county is one of the border counties of the southwest part of the State, with McDonald county only lying south. It contains 611 square miles of land, nearly equally divided with timber and prairie, all producing well.

The numerous streams of the county are kept flowing the year round by never-failing springs; and these afford the best kind of water power for all kinds of machinery, much of which is already in operation. The rainfall averages about forty-five inches per year, and the lands are not subject to severe drouth. Total taxable property, about

$3,000,000. There is no bonded indebtedness, and the rate of taxation is one and thirty one-hundredths dollars per one hundred dollars. Two railroads pass through the county with some fifty miles of railroad bed; other roads in contemplation. The land is composed principally of two kinds of soil: 1. The coarse gravel or black soil; is rich, easily worked, and produces well. 2. The mulatto soil, a rich, reddish loam, well suited to the growth of corn, wheat and other cereals.

Crop Report.

1881.

Articles.	No. of acres.	Yield per acre
Wheat harvested	75,000	6 bushels.
Corn harvested	60,000	15 bushels.
Oats harvested	10,000	15 bushels.
Tobacco harvested	500	700 pounds.
Apples harvested	2,000	5 bushels.

Remarks.

Difficult to make estimates on account of the damage from drouth and chinch bugs.

NODAWAY COUNTY.

Population, 29,560. Nodaway county is one of the best agricultural counties in Missouri.

SOIL AND SURFACE CHARACTERISTICS.

The soil is a deep, rich, black loam, so closely resembling the best prairie lands of Illinois that it is difficult to detect any difference.

About seven-eighths of the county is prairie and bottom land, and one-eighth timber land; and almost every acre—prairie, bottom or timber—is susceptible of a high state of cultivation. There is plenty of timber for all time to come.

The county is watered by three large streams, flowing from north to south, and water-power is abundant.

Some coal mines are now worked, yet the coal interest is in its infancy.

WATER-POWER.

There are a good many water-mills, distributed at convenient places on the Nodaway, the One Hundred and Two and Platte rivers and many mill sites on each of said streams not yet utilized.

SHEEP RAISING AND STOCK GROWING.

Sheep growing is an industry rapidly on the increase. The undulating prairie lands are well adapted to the sheep interest. There are woolen mills, where excellent cloths are made.

Railroads run through the county, so that it is a matter of great ease to get about. There are through lines to Chicago and the east, St. Louis and the east and south, Omaha and the west.

FINANCIAL.

The county is out of debt; taxes are light, and times are good. The roads are well bridged and repaired, leading in every direction.

For farming and grazing, this section is not surpassed by any county in the west. The people are industrious, intelligent, enterprising, and are determined to succeed.

CROP REPORTS.

1881.

Articles.	No. of acres.	Yield per acre
Wheat harvested	20,000	10 bushels winter 6 bushels spring
Corn harvested	230,000	20 bushels.
Oats harvested	20,000	25 bushels.

Remarks.

A full average of wheat sown, but two-fifths of it was winter killed; spring wheat short on account of the late spring; all crops, and especially vegetable, injured by drouth; corn not over half a crop.

OREGON COUNTY.

Population, 5,791. Oregon county is one of the southern tier of counties, and was organized in the year 1845, and contains an area of over 500,000 acres. This is one of the favored counties of South Missouri. Unlike other counties of that section, it is quite varied in character, the north and northeastern part being hilly and high rolling plateau, and principally covered with pine forests; yet, there is an immense amount of good farming land in that part of the county, known as the Irish settlement.

CHARACTER OF THE LAND.

In the south and southwestern part of the county the greater part of the land is arable and fitted for cultivation, the timber consisting mostly of hickory and oak, the soil being a rich, sandy loam, and in that part of the county there is a greater amount of river and creek bottom land, perhaps, than in any other county of that section of the State, for, by referring to the map of Missouri, it will be seen that the river, Eleven Points, winds through the county, in such a way that it is over fifty miles from where the river enters it on the west to where it crosses the line on the southeast part. Fredericks' Fork runs almost through the entire county, and there is scarcely a place, from its head to its mouth, but there is farming land of the very best quality; then the Warm Fork, of Spring river, in the southwestern part, running through over twenty miles of the county, can hardly be surpassed in the State for its quality of farming land, and there are many small tributaries to these streams mentioned, the valleys of which are very rich in soil. In the last named portion of the county, that is, south of the river, Eleven Points, there is a vast amount of valley and uplands,

or hickory flats, all of which is good farming land, and easily prepared for the plow and put into cultivation. This is also one of the best watered counties in the State, and every foot of land not in cultivation, whether it be valley, plateau or hill side, is covered from the first of April to the middle of November of each year with a rich growth of wild grass, which is very fine for grazing and stock raising. There are several natural curiosities in the county, in the way of large springs or fountains, one of which boils up almost at the top of a mountain, and covers an area of over one acre, the water running off down the mountain at the rate of twenty miles an hour, making quite a river, and being an inexhaustible power for machinery.

AGRICULTURAL RESOURCES.

The soil is adapted to almost everything—wheat, corn, cotton, oats, rye, potatoes and peanuts, etc.; in fact, nearly everything that grows from Maine to Florida, can be grown successfully in this county. In cotton alone, for the year 1879, there were raised in the limits of the county 1,620 bales, of five hundred pounds each, which, at fifty dollars per bale, yielded a profit of $81,000; and it is estimated that, for the year 1880, there will be double that amount raised; as to corn, it would be difficult to estimate the amount that was raised, but it may be safely said that there is more corn now than the present population can consume during the season. It sells from twenty to thirty-five cents per bushel, which is evidence that it is plenty.

OSAGE COUNTY.

Population, 11,824. Osage county is located in the central portion of the State, having the Missouri river for its northern boundary; the Osage river and Cole county is the western boundary, while Maries and Miller counties join it on the south, and Gasconade county bounds it on the east.

In area it contains about 600 square miles, and there are 368,471 acres on the assessor's books.

PHYSICAL FEATURES AND PRODUCTIONS.

The county is greatly diversified and abounds in hills and valleys, also bottom lands and flats. The hills are not high mountain ranges, but usually gentle declivities, and many are cultivated. The valleys are productive, and the bottoms exceedingly so, while the flats repay

the farmer well for his labor. Corn is the staple crop; wheat next in value. Oats are raised in abundance. Rye, buckwheat, Hungarian grass, flax, etc., produce good crops, but are not extensively cultivated.

Hogs and cattle are raised for market, so are sheep and poultry, but not so much capital invested in the two last named as might be, at a good profit.

The principal business of the people is farming. A few are engaged in converting the timber into railroad ties, for use on the "woodless plains of the far West." There are no statistics of the "tie business," but it would be within limit to say Osage county furnished $40,000 worth of ties within the last twelve months.

The manufacturing resources of the county are entirely undeveloped, and are worthy of consideration and investigation by those who desire or intend to invest in manufacturing projects.

The county is well watered by the Missouri, Osage, and Gasconade rivers, and unnumbered springs, creeks and branches.

TRANSPORTATION.

The means of transportation in the county are not confined to the Missouri Pacific Railroad, which passes through the north part of the county from east to west. In addition to the facilities afforded by this road, the Osage and Gasconade rivers, as well as the Missouri river, offer ways to market.

CROP REPORT.

1881.

Estimates of the number of acres cultivated is not given, but the average yield is given as follows:

Articles.	Yield per acre
Wheat	8 bushels.
Corn	10 bushels.
Oats	7 bushels.

REMARKS.

Drouth, chinch bugs and extreme heat is the cause of the short crop.

OZARK COUNTY.

Population, 5,618. Ozark county is located in the center of the southernmost tier of counties, and is bounded on the north by Douglas county, on the south by the State of Arkansas, east by Howell county, and west by Taney county. The present population of the county numbers about 6,500.

SURFACE CHARACTERISTICS.

The hills and valleys give Ozark county a pleasantly diversified landscape. The soil is varied. The uplands afford fine grazing as well as farming lands, and the bottom lands are richly productive. There is an abundance of grass on the hills and among the timber for stock, and also plenty of fine, running water. The principal streams of the county are Bryant's Fork of White river, which flows into the North Fork of White river, and a number of smaller tributaries of the same rivers. There is scarcely a square mile of land in the county not well supplied with water, and drouth is something unknown.

PRODUCTIONS AND MARKETS.

The principal productions of the soil are corn, wheat, oats, rye, barley, potatoes, tobacco, sorghum, and every variety of fruit and vegetables suitable to this latitude.

The county being an "off railroad" county, as yet the chief market for the farmers of Ozark is in Arkansas, where the cotton raisers create a demand for all the surplus productions.

PRICE OF LANDS.

Land is cheap in Ozark. Owing to its location, it is thinly settled at present, although immigration seems to be setting in this direction. Government lands still remain for entering, and farms can be purchased at from three dollars upwards, according to improvements.

PEMISCOT COUNTY.

Population, 4,299. This county lies in the extreme southeastern portion of the State.

Pemiscot county, taking its name from a bayou of the same name, originally called "Pemascon," and meaning "rich mud," was once a part of New Madrid county, from which it was stricken off in 1850. The north boundary line is somewhat below the parallel of 36° 30′ north latitude, and is very irregular, over half the distance being natural water courses. Its eastern boundary is the Mississippi river, giving the county a water front of over forty-five statute miles. The south boundary line being the line between the States of Missouri and Arkansas, is on the parallel of 36° north latitude, and extends west from the Mississippi river, thirteen and one-half, to a point two and one-half miles west of range line No. 10 east. The western boundary conforms to the subdivision line, running north, to within one and one-fourth miles of the northern boundary line of township 20, north range 10 east. The county of New Madrid lies north of Pemiscot and Dunklin on the west.

The area of the county in square miles is 478, equal to 306,345 acres. Of this number of acres, there are 4,498 of United States lands reserved by the government for homesteads to actual settlers, which can be had by heads of families by paying land office fees, and residing on the land entered five years. 41,772 acres belong to the county and can be entered at the county land office, at one dollar and twenty-five cents per acre. 6,110 acres are unsold school lands, belonging to the townships in which they lie. 15,515 acres are in lakes and Little river overflows. 238,447 acres have been sold, and are now owned by different individuals, by the United States and by the county, and on which taxes are levied.

SOILS.

The soil is what is termed in the parlance of the country, "made land," a rich alluvium, deposited ages since the glacial age, made by the changes and shiftings of the great river that passes the eastern shores. The footprints of the waters are upon the country. The evidence is convincing that a broad river, or gulf, once marked the bluffs, now known as Crowley's Ridge, carrying within itself the slime, mud and sands from the mountains, the work of abrasion and erosion in the far-off ages of the past, upon a gigantic scale; while upon its broad sur-

face floated the wrecks and debris of primeval forests, washed from the shores above, to lodge in the waters below, and form a nucleus around which sands and decaying vegetation could lodge until islands were formed in the bosom of this great desolate sea. Delve wherever one may in this "made land," and hundreds of feet below the surface are found the giant trees of the old forest, which played an important part in filling up and holding in place the vast deposits which have made the richest portion of the habitable globe. In the course of time, a well defined channel was marked out through the land that rose from the great gulf, which has surged backward and forward, from hill to hill, for ages upon ages, forming new rivers, and filling up old ones, but ever leaving its mark upon the land through which it has so ruthlessly cut.

LAND PRICES, ETC.

What Pemiscot county wants is colonies of immigrants who are not afraid to labor, and who will level her forests, drain her low places, and convert them into blooming fields of cotton, and waving corn, and green grass. There are hundreds of thousands of acres available, and only awaiting the hand of the sturdy, honest laborer to convert them into rich fields of golden grain and magnificent gardens. These lands are within the reach of all who want homes. Where the government owns it, it can be had by paying the fees and residing upon it for five years, a 160-acre tract costing, from first to last, about forty-five dollars, twenty-five of which is paid down when the entry is made, and the balance after the expiration of five years' occupancy of the homestead. Where the county owns the land, it is sold at one dollar and twenty-five cents per acre, and entered either with money or levy scrip. Where the land is owned by individuals, the prices range from one dollar to twenty-five dollars per acre, according to location. Any amount of good land without a stick of timber amiss, can be bought at one dollar and fifty cents and two dollars per acre, and some even lower. Lands on or near the Mississippi river, improved, with good buildings, can be had for fifteen and twenty dollars per acre.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre.
ultivated in wheat	225	10 bushels.
ultivated in oats	100	20 bushels.
ultivated in corn	5,000	10 bushels.
ultivated in cotton	2,500	

PERRY COUNTY.

Population, 11,895. Perry county lies in the southeastern portion of he great State of Missouri, and is bounded north and east by the Mis-issippi river, fronting on this great highway of commerce for more han forty miles; south, it is bounded by the counties of Cape Girar-eau and Bollinger; west by Madison and northwest by the counties f St. Francois and Ste. Genevieve.

THE SOIL.

The soil on the uplands of Perry county is a sandy loam, inter-nixed with clay, and is very productive, particularly of small grain; hat of the bottoms, or low lands, along the Mississippi river, and some f the creeks, is a black loam, as fertile and productive as any land in he world.

CROPS AND PRODUCTIONS.

The uplands are more adapted to the raising of small grain, such as wheat, barley, rye, corn and oats,and are also well adapted to the raising of all kinds of fruit, apples, peaches, pears, cherries, plums, strawberries, etc. The western portion of this county is particularly suited for fruit and grape culture. The low or bottom lands cannot be

excelled for corn and wheat. Besides the above, all kinds of cereals, such as are adapted to a temperate climate, are profitably raised here.

Perry county wheat received the first premium at the St. Louis Fair in 1875, and at the Centennial Exhibition in 1876, for quality and quantity. There has never been a single failure of crops on account of drouth.

THE LAND AND PRICES OF FARMS.

Perry county contains about 295,356 acres of land, of which about one-fourth is under cultivation; the other three-fourths are yet wild lands, awaiting the industrious settler to cultivate, or the miner to bring forth the treasures hidden beneath the surface.

The wild lands are thickly covered with timber, such as cotton-wood, linn, ash, poplar, black and white oak, post and water oak, over cup and Spanish oak, and in some few localities are found large pines and luxuriant groves of cedar.

The prices of land, both improved and unimproved, vary a great deal, according to quality and locality, say from $1.25 to $50 per acre; and there are over 3,000 acres of government land and unsold school lands in the county.

RAILROAD FACILITIES.

Perry county has no railroad, although two lines, one from Pilot Knob, Iron county, Missouri, to Grand Tower, and the other from Iron Mountain, via St. Mary's to Chester, Illinois, have been surveyed, but are not constructed as yet. The public roads are, except during the winter months, in an ordinary good condition, as good as they can be made and kept under the system of the present Road Law.

MARKET FACILITIES.

The market facilities are great, for the farmers are connected, by the great Mississippi, with all the world. With cheap freight, and landings accessible to all the citizens, they have a decided adantage over those counties which have nothing but railroads. Moreover, the mills and merchants afford citizens ample facilities to turn into money anything they may have to sell, from old iron and rags to the finest cattle, hogs or horses, all of which are bought at home and shipped to other markets.

PETTIS COUNTY.

Population, 27,298. Ferdinand DeSoto, the Spanish explorer, crossing the Mississippi river, penetrated to the country south of the Mississippi river, and, according to some, spent the winter of 1751–2 in or near the present county of Pettis; but there were no settlements made in Central Missouri until 1810, when a colony located near Boone's Lick, in Howard county; and, in 1818, the first settlement in Pettis county was made on Heath's creek. These early settlers thought that the prairie lands were almost valueless for farming purposes, and they built along the streams, in the timber.

In fourteen years after the first settlement the population had increased to 600, and then the county was first formed. In 1840, the population was 2,030; in 1850, it was 5,150; in 1860, it was 9,392; and then came war, with its dangers, its conflicts, its animosities and its bloodshed. Many abandoned their farms, and land became of little value; but the war had scarcely closed when population commenced to pour into the county, and lands were soon actively selling at high prices. In 1870, although nearly one-half of the preceding decade has been distracted by civil strife, the population numbered 18,706, and it has been steadily increasing since that time, and is now probably between 35,000 and 40,000.

LOCATION—WATER—SOIL.

Pettis county, situated near the center of the State, has an area of 446,289 acres, of which about 100,000 acres are timber lands, and the balance prairie. The soil is of five kinds, viz.: "Mulattoo" soil, with red clay subsoil; same soil, with chocolate colored subsoil; black soil, with either red clay or chocolate colored subsoil; and gray colored soil, with a variety of subsoil. Each of these kinds have special adaptations for the uses of the farmer.

The prairie is gently undulating, and the county is well watered by Blackwater, Heath, Beaver Dam, Brushy, Turkey, Muddy, Flat, Lake, Spring Fork, Basin Fork, Camp Branch and Elk Fork creeks, and the La Mine river, with their smaller tributaries. There are also many springs, and wells of living water may be obtained in nearly all parts of the county, at twenty to forty feet. All farmers also have artificial ponds, which retain water throughout the year.

The bois d'arc, or osage orange, grows readily, and is largely employed for fencing.

RAILROAD FACILITIES.

The pioneers of immigration chose a location with very little reference to railroads, either actual or prospective, but those who now come bring their capital with them, and want to know what facilities they will have for receiving and shipping goods, and the cost of doing so, compared with the cost from other points. In these matters the county can make a good showing.

The oldest railroad is the Missouri Pacific, which forms the direct line between St. Louis and Kansas City, Denver and the Pacific Coast, it being 189 miles to St. Louis, and 96 to Kansas City, with no other town one-third as large between these two places.

The Missouri, Kansas and Texas Railway Company was organized in 1869, being a union of several companies; in 1870 it ran its first passenger train to Clinton, a distance of forty miles, and in less than three years afterward the line was completed to Dennison, Texas, a distance of 433 miles to the south, and to Hannibal, a distance of 142 miles to the northeast, making, in connection with other roads, a continuous route from Chicago to Galveston. It furnishes the most direct outlet to Chicago, and many of the stockmen make their shipments to that market. By the competition of this road and the Missouri Pacific, freights are low, and good rates can be obtained here for shipping, either to or from Sedalia. The general offices and the machine-shops of the Missouri, Kansas and Texas Railway are in Sedalia, and give employment to a large number of clerks and mechanics, and add greatly to the prosperity of the city.

The St. Louis and Lexington Railroad runs from Sedalia to Lexington, on the Missouri river, laying tribute to Sedalia some of the richest portions of the State.

CROP REPORT.

1880.

Articles.	No. of acres.	Yield per acre
ultivated in corn	95,000	30 bushels.
ultivated in wheat	90,000	16 bushels.
ultivated in oats	30,000	35 bushels.
ultivated in flax	1,000	10 bushels.
ultivated in sorghum	100	65 gallons.
ultivated in tobacco	100	
ultivated in timothy and clover	35,000	1½ tons.
ultivate in vineyards	100	
ultivated in pasture	71,260	

PHELPS COUNTY.

Population, 12,565. Phelps county is situated in the southeast entral part of the State, and is drained by the Gasconade and Meramec rivers and their tributaries. The county was formed from Crawford county, and was organized November 13, 1857.

TOPOGRAPHY.

The elevation of the county is from 700 to 900 feet above the Mississippi river, at St. Louis. The surface is gently rolling in the interior, ut, along the larger water courses, is broken and rocky. The scenery n some places is magnificent. There are caves in many places, and ome bluffs, almost perpendicular, and from two to three hundred feet igh, such as are seen in all limestone countries.

The river and creek bottom lands vary from a hundred yards to a mile and more in width; are bounded by high ridges, on the tops of which are large areas of table land, nearly level or gently undulating. Between these ridges the surface of the country is diversified by broad, smooth, but irregular swells, between which are fertile valleys, from a few yards to a mile wide, and frequently several miles in length, with fall enough for good drainage.

THE SOILS AND PRODUCTIONS.

The river and creek bottoms are very fertile and productive, and will compare favorably with any river or creek bottoms in the Union. The valley lands are next in fertility. The soil of these valleys is more or less mixed with sand; is kind and free, and well adapted for the raising of all crops produced in this climate. The uplands, on the broad ridges and hillsides, are clay subsoil underlaid with limestone, gravel and mineral. The soil is sufficiently fertile for all farm products, but especially adapted to small grains, fruit and tame grasses. It is believed by many of the best farmers that the uplands will be the most valuable lands of this county, at no distant day. With the very indifferent culture they now receive, they yield fair returns in crops of a greater variety than can be raised on bottom or valley lands. With deep culture, those lands stand both drouth and wet remarkably well; and as clover grows almost spontaneously, any practical farmer can see how easy and cheap this land can be enriched to any desired degree. No land in the world shows a better and more lasting effect, if manured than this. The rocky ridges will not be utilized for farming in the near future; but they are mostly covered with timber and grasses, furnishing good pastures for all kinds of stock, and containing rich mineral and valuable rocks.

The prairies are small, compared with those of North Missouri and other prairie countries. The soil of the prairies is about the same as that of the uplands.

ACREAGE AND PRICE OF LAND.

There are 429,163 acres of land—about 50,000 acres improved, about 50,000 acres are Government land, and 55,000 railroad land, which can be bought at from one dollar and twenty-five cents to five dollars per acre. Farms with more or less improvement can be bought of those who have too much land, or those who wish to go further toward the frontier, at from five to fifteen dollars per acre.

PIKE COUNTY.

Population, 26,716. Pike county has a fortunate and commanding location. It has easy command of the Mississippi Valley, by the grandest water-way of the Union. The St. Louis, Keokuk and Northern Railway gives it railway connections with Hannibal, Keokuk and St. Louis. The Quincy branch of the Chicago, Burlington and Quincy road gives an outlet north and east; the Chicago and Alton road gives a direct Chicago, St. Louis and Kansas City connection, and the St. Louis, Hannibal and Keokuk road connects with Hannibal. It has an area of 424,266 acres, has an easterly river front of forty miles, and is bounded on the north by Ralls county; on the west by Ralls and Audrain counties, and on the south by Lincoln and Montgomery counties. The face of the county is singularly attractive. Along the river are scores of grand, wooded bluffs, forming a chain of bold, well-defined peaks, from one hundred to two hundred and fifty feet elevation. Alternating with these are charming ravines and valleys, reaching inland from the river through the timber belts, to where they are lost in the high, rolling prairie, and plain districts.

SOIL AND PRODUCTIONS.

The soil of this county is very rich and productive, and for fruits, grains, vegetables and grasses, will rank with any in the West. The surface soils of the timber districts are rich and warm, being quick, reddish, yellow and dark loams, from six to fifteen inches deep, and are everywhere underlaid with the loess deposit—a porous and flexible subsoil, mostly composed of silicious matter combined with lime and magnesia carbonate, the phosphates, alumina, etc. It is a very rich subsoil, and produces the finest fruits, grasses and wheat known to agriculture. The prairie soil is a dark, rich alluvial, eight to twenty inches deep, produces luxuriant crops of corn, grass and vegetables, and is underlaid with the same alien loess deposit. This remarkable soil slacks like quick-lime on exposure to frost and air, and will endure greater excess of drouth and moisture than any soil in the world.

MANUFACTURES AND RAILROADS.

There are a score of steam saw and flouring mills; as many miscellaneous manufacturing concerns; about one hundred miles of rail-

way, divided between the St. Louis, Keokuk and Northern Railroad, following the Mississippi river across the entire county; the Chicago and Alton crossing the entire central division of the county from east to west, and the St. Louis, Hannibal and Keokuk, crossing the entire central division from north to south. These three lines give the county fourteen passenger and shipping stations, leaving no producer more than two hours drive from a railway market.

PRICE OF LANDS.

The cheapest lands in America are in old Pike county and the other counties of Northern Missouri. In Pike county are noble reaches of wild land (timber and prairie) of inexhaustible soil, and having hundreds of purchasers, at four to ten dollars per acre. These tracts are sandwiched between fine, old farms, and are neighboring to churches, schools and mills, and are surrounded by refined and well ordered society. They are relatively one hundred per cent. cheaper than free homesteads on the far western border, and absolutely cheaper than wild lands four hundred miles further west, on the treeless plains.

Many improved farms are offering at eight to twenty-five dollars per acre, on easy terms of payment—farms that in Illinois or Iowa would go on a quick market at twenty-five to fifty dollars per acre. Many of these farms are offered for less than the cost of buildings, fences and orchards thereon.

CROP REPORTS.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	50,000	15 bushels.
Cultivated in wheat	34,000	12 bushels.
Cultivated in oats	25,000	30 bushels.
Cultivated in flax	125	
Cultivated in sorghum	100	40 gallons.
Cultivated in tobacco	800	1,500 pounds.
Cultivated in timothy and clover	6,200	1 ton.
Cultivated in vineyards	100	
Cultivated in apples	11,000	40 bushels.

1881.

Articles.	No. of acres.	Yield per acre
ultivated in corn.....	56,568	10 bushels.
ultivated in wheat	56,568	10 bushels.
ultivated in oats	33,941	30 bushels.
ultivated in timothy	67,882	1 ton.

PLATTE COUNTY.

Population, 17,373. Platte county is located in the western part of ıe State, and is bounded north by Buchanan county; east by Clinton ıd Clay, and south and west by the Missouri river, which separates it om the State of Kansas. Its area is 276,000 acres.

By census of 1870, it contained a population of 17,352, of which ,160 were white, and 1,192 were colored; 9,114 male, and 8,238 female; ,359 were natives, and 993 foreigners.

PHYSICAL FEATURES.

About one-fifth of Platte county is beautiful, undulating prairie, ıe soil of which is of unsurpassed fertility. The remainder is heavily mbered with the various species of oak, hickory, walnut, elm, hack-erry, etc., and, when cleared, produces fine crops. The Missouri bluffs re generally too steep to be cultivated, but are well adapted to be rowned and flanked by beautiful vineyards. The growth on them is bout the same as that upon the uplands.

AGRICULTURAL RESOURCES.

The agricultural products are corn, wheat, oats, hay, barley, rye, ıemp and tobacco. Sorghum and sweet potatoes and buckwheat, grow

luxuriantly. Blue grass grows spontaneously where timber has been thinned out, and timothy and red-top, and other grasses, succeed well. The soil is well adapted to fruit raising, and the number and extent of orchards are annually increasing, many farmers making them a specialty. Stock raising is a source of great wealth to the county, and, of late years, some fine breeds of animals have been introduced with marked success.

THE PRICE OF LAND.

Good farms can be purchased at from $12.50 to $30 per acre, according to location and improvement. The people are generous, hospitable and orderly, and realize that their county is among the best to be found anywhere, and, consequently, are contented and happy.

RAILROADS.

The Kansas City, St. Joseph and Council Bluffs Railroad runs northwest through the county, along the Missouri bottom, for about thirty miles. The Chicago, Rock Island and Pacific Railroad traverses the county, from the iron bridge across the Missouri river at Leavenworth, in a northeastern direction, for twenty-six miles. There are also ten miles of this road connecting Edgerton and Atchison, by way of New Market, thus affording ample shipping facilities to that productive region.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in wheat	60,000	7 bushels.
Cultivated in oats	20,000	30 bushels.
Cultivated in corn	30,000	10 bushels.
Cultivated in apples	4,000	5 bushels.

REMARKS.

The unprecedented drouth, together with extreme heat and chinch bugs, have cut all crops from 50 to 75 per cent.

POLK COUNTY.

Population, 15,745. Polk county has an area of 640 square miles; is twenty-four miles in width from east to west, and twenty-six and one-half in length from north to south; lies in Southwest Missouri, on the northern slopes of the Ozark range and is drained by tributaries of the Osage; comprises 410,000 acres, a little more than one-third of which is rich prairie, generally level, but frequently gently undulating. About one-fifth of the county is alluvial creek and river bottoms, very productive and frequently well timbered; the balance of the county consists of rich valleys and timbered uplands, very much of which is best adapted for pasturage. The surface is generally rolling, and along the breaks of streams hilly and rocky.

RAILWAYS.

There are three projected railways through Bolivar, the county seat. The Laclede and Fort Scott, from Lebanon, on the St. Louis and San Francisco Railway, to Fort Scott, Kansas, which is graded to Bolivar, and will likely be completed this year; the Sedalia, Warsaw and Southern, from Sedalia, on the Missouri Pacific Railway, to Springfield, which is now in course of construction; and the Kansas City and Memphis, which was mostly graded some years ago from Kansas City to Osceola, thirty-six miles northwest of Bolivar, and which is now being rapidly constructed by a company of Boston capitalists. With the completion of any one of these railways through the county, Polk will soon resume her former position as the second best county in Southwest Missouri, as will be shown by an examination of her production of grain, live stock, etc., elsewhere stated.

SUMMARY—PRICE OF LANDS—SOCIAL, RELIGIOUS AND FINANCIAL MATTERS.

The county is remarkably healthy, being almost free from malarial and miasmatic diseases. Its cool, gushing springs of pure water are numerous; its hills and valleys afford fine pasturage; lands are cheap—good, unimproved lands being held at from $2 to $10 per acre, improved at from $5 to $15, and fine pasture lands at from fifty cents to $3—and agricultural pursuits profitable. The society is excellent and citizens hospitable; churches numerous, and well attended. Religious denom-

inations are generally represented, and the Baptist, Methodist, Presbyterian and Christian orders are the leading. Politically the county is very nearly equally divided. The county is in a healthy financial condition. It has no floating debt, its warrants are at par, and the interest on its bonded debt of $33,500 is promptly paid as it matures. Taxes are low, the county credit good, and, in short, the county presents many inducements to immigrants seeking good homes in the great West.

PULASKI COUNTY.

Population, 7,250. Pulaski county lies on the eastern border of what is known as Southwest Missouri, 150 miles southwest from St. Louis, and is bounded on the north by the counties of Miller and Maries; on the east by maries and Phelps; on the south by Texas and Laclede; and on the west by Laclede and Camden.

PHYSICAL FEATURES.

Like the rest of the country bordering on the Gasconade river, it is of a rather hilly and undulating nature. The Gasconade river, one of the large streams of the State, traverses the county from west to south flowing toward the northern part of, and leaving the county at nearly the northeast corner, its banks being the starting point of thousands of acres of broad, unexcelled bottom lands, of exceeding fertility. Roubidoux Creek enters the county from the south, flows due north, and enters the Gasconade river near the center of the county, about two miles northwest of the county seat. The Piney Fork of the Gasconade enters the county at the southeast corner thereof, and, flowing northwardly, enters the Gasconade river about six miles from where the Gasconade leaves the county. A portion of Lick Fork, of the Gasconade river, flows through a portion of the southwest quarter of the county.

SOILS AND PRODUCTIONS.

It will be seen that Pulaski county has agricultural advantages inferior to no other county in the State. The river bottoms are of allu-

vial deposits, rich in sandy loam, of unknown depth. The soil on the smaller streams is of great depth, with yellow and red clay foundations. The soil in the numberless valleys, interspersed over the county, is of proportionate quality, according to their altitude. The soil on the ridges is very fertile, being what is known as black hickory, black jack and post oak soils, and is exceedingly fine for the production of all the cereals generally raised in this latitude, such as corn, wheat, oats, rye, barley, all the grasses and garden productions. The soil of the river bottoms bordering on the Gasconade, Roubidoux, and all the streams, is so rich that it is known as the "Scioto Corn Regions" of Southwest Missouri. All the fruits grow here equally well in the bottoms as on the ridges. There are thousands of acres in this county that have not as yet been brought under cultivation, and are on the market. The range in this county cannot be surpassed; and, for sheep raising, the famous hills of Vermont have found a rival.

TRANSPORTATION.

The St. Louis and San Francisco Railroad, which traverses the entire county, north of the center, furnishes an outlet to the markets of the world, for all surplus grain, stock, etc., that seek one.

PRICE OF LANDS.

The price of lands is very low, when the advantages this county offers to the settler are taken into consideration. Good, well improved lands sell at from ten to fifteen dollars per acre, and wild lands at from five to eight dollars per acre.

The improved farms contain good houses, stables, out-houses, orchards and the very best of soil, and are conveniently located to churches, schools and railroads.

CROP REPORT FOR 1881.

No estimate of acreage given. Correspondent States half crop of wheat harvested. Half crop of oats, and corn not over one-third the usual yield.

REMARKS.

Drouth and heat have ruined the crops.

RALLS COUNTY.

Population, 11,838. Ralls county is located in the northeastern part of the State, on the Mississippi river, the fourth county from the Iowa line, and the fourth north of St. Louis; bounded north by Marion county, west by Monroe, south by Audrain and Pike counties, and east by the Mississippi river.

HOW WATERED.

The county is divided into two nearly equal parts by Salt river, a fine, fast flowing stream of considerable size, meandering through it from west to east. This stream, together with numerous creeks and many flowing springs, furnishes abundance of clear, living water, to a very large portion of the county. Quite a number of bold, bubbling mineral and salt springs are found in the county, and at some three or four of which salt was manufactured in the pioneer days, viz.: at Saverton, Fremore and Bouvits Licks, and perhaps at other places.

The surface of the country is generally undulating, and susceptible of varied cultivation, while the eastern part, along the "Great river," is somewhat broken and rough; the central and western portions comprise large expanses of beautiful, rolling prairie, and large tracts of the most fertile elm and oak lands. About three-fifths of the county was formerly covered with timber; large tracts growing the finest white, red, black and burr oak, black walnut, white walnut, linden, red and slippery elm, hackberry, cotton wood, hickory, black and blue ash, etc. The prairie in its natural state produced a rank growth of tall, nutritious grass, affording the best of pasture—all indicating a soil of great virgin fertility. Rock, limestone and sandstone, particularly the former, abounds, yet not in a shape to interfere with cultivation—though furnishing the best of building material at a merely nominal cost.

THE SOIL.

In the "bottoms" along the rivers and creeks, is a deep, rich, indestructible alluvium, seldom, if ever, failing to yield enormous crops as neither drouth nor rain seems to seriously affect the growth of vegetation here, sand entering so largely into the composition of the soil as to permit the excess of water to sink in wet weather, and the great

depth of the alluvium affording a constantly arising moisture during seasons of drou th.

The prairie soil consists of a rich, black loam, ranging from ten to twenty inches in depth—very fertile. The soil of timbered uplands is of different qualities, as indicated by the different kinds of timber. Where is found a tract now, or formerly, covered by a large growth of lofty elm, walnut, hackberry or linden, there is a deep, black soil, generally on a red clay substratum, almost as fertile as the bottom lands, and really better adapted to the production of small grain than they. The oak lands produce the finest wheat.

TRANSPORTATION, MARKETS AND TOWNS.

The broad Mississippi sweeps along the eastern border. The Hannibal and St. Joseph Railroad strikes into the north and northwest. The Missouri, Kansas and Texas passes through the northern part, the St. Louis and Keokuk along the eastern line; the St. Louis, Hannibal and Keokuk runs through the east central part through the county seat toward St. Louis; the Chicago and Alton touches the southern part, and the Ralls County Branch, graded and ready for the ties, runs southwest through the best portion of the county, through the coal region in the direction of Mexico and Jefferson City.

RANDOLPH COUNTY.

Population, 22,751. Randolph county lies between the 91° and 92′ parallel of longitude, and 39° and 40′ north latitude, between the Mississippi and Missouri rivers. It is part of the great water shed of North Missouri, and sends off its streams to each river, thus giving rise to beautiful belts and groves of timber, interspersed with magnificent prairies. It is bounded on the north by Macon and Shelby, on the east by Monroe and Audrain, on the south by Howard and Boone, and on the west by Chariton county. The grand divide and old Indian trail pass in a northern direction through the eastern part of the county, leaving more than one-fourth, on the east, drained by streams

flowing to the Mississippi, while on the west they flow to the Missouri river. In the west, along Silver creek, the county is quite rolling. Near the Chariton river, in the west, the land is undulating. The slopes adjacent to Dark and Nuncas creeks are gentle, becoming more rolling near the middle forks of the Chariton river, in the northern part of the county. Near the east fork of Walnut and Sugar creeks, it is more rolling.

The prairie east of the grand divide, with the timber skirting it, comprises about one-third of the county, and is finely adapted to general agricultural pursuits. The western portion of the county contains more timber than prairie land.

The land is rich and of great productive qualities.

The railroad facilities in the county are quite extensive, and the county has paid all subscriptions excepting one township, which owes a small bonded debt on railroad subscription. The Wabash, St. Louis and Pacific runs through Prairie, Sugar Creek, Cairo, Jackson and Salt Spring, a distance of about forty-three miles, passing through the towns of Renick, Moberly, Cairo and Jacksonville, on its northern extension, and through Huntsville and Clifton on its main line to Kansas City. The Missouri, Kansas and Texas traverses the county from east to west, through Union and Sugar Creek townships, to the city of Moberly, and then in a southwestern direction, through Prairie and Moniteau, and through the towns of Elliott and Higbee, a distance of twenty-three miles. The Chicago and Alton, through Prairie, Moniteau and a portion of Silver Creek, and through the young towns of Clark, Higbee and Elliott, a distance of eighteen miles; and the Missouri and Mississippi Railroad intended to run from Keokuk, Iowa, to the Missouri river, is graded through the western part of the county, a portion of the same being already built from Salisbury to Glasgow.

PRICE OF LAND.

Farms can be purchased at various prices, ranging from eight to twenty-five dollars per acre, according to location, improvements, etc., and unimproved land much cheaper.

Crop Report.

1880.

Articles.	No. of acres	Yield per acre
Cultivated in corn	50,000	40 bushels.
Cultivated in wheat	20,000	18 bushels.
Cultivated in oats	10,000	35 bushels.
Cultivated in flax	100	
Cultivated in sorghum	300	100 gallons.
Cultivated in timothy and clover	116,300	1,000 pounds.
Cultivated in vineyards	300	1½ tons.

RAY COUNTY.

Population, 20,200. Ray county has an area of 561 square miles, and 359,000 acres. It is bounded on the south by the Missouri river, on the west by Clay and Clinton counties, on the north by Caldwell county, and on the east by Carroll county. It is less than thirty miles from Kansas City, and only forty miles southwest of St. Joseph. Leavenworth and Atchison are within forty miles of its western border. It is fortunate in latitude, natural and artificial lines of transportation and travel, and especially so in its relation to the great central markets of the country. The topographical features of this county, too, are an attraction. Instead of low and somewhat swampy country, are beautiful, arable valleys, graceful, swelling prairies, charming intervals, ranges of low hills, and along the Missouri river, some of the most picturesque bluff lines in all the western country. One-fourth of the county is valley, principally along the Missouri river. The Missouri bottoms, which at some points are low, dead flats, subject to overflows, are here across the entire south border of Ray county, high "bench" lands, fifteen to thirty feet above the

river bed, with admirable natural drainage, and always available to the agriculturalist. They are from one to ten miles wide, their average width across the country being about six miles. One-third of the county is made up of rolling prairies and parks. The prairies never drop into levels or plains, as in western Kansas and Nebraska, but resemble more the dead swells of a heavy sea, have natural drainage, and are, next to the parks, the finest feature of the landscape.

THE SOIL AND ITS PRODUCTIVENESS.

In the bottoms and "benches" it is, of course, the inevitable alluvium, black with vegetable decomposition and inexhaustibly rich with the drift of many ages. Here are lowland cornfields that have given fifty successive crops, covering an annual yield of fifty, seventy, ninety and one hundred bushels per acre, and show no more sign of diminution in yield than when the pioneers gathered the second crop. One-fourth of the whole county is of this imperishable soil, that will be growing mammoth corn when American civilization is a thousand years old. On the high, rolling prairies, the soil is the same dark, rich, vegetable mould that attains in Illinois and Iowa from two to five feet in depth, and is underlayed with the famous loess, or lacustrine deposit, which is mostly composed of fine silica, is rich in the carbonates and phosphates of lime, and runs down to the bed rock.

LAND PRICES.

Good farms in the valleys, on the high prairies, or in the timbered districts, with good homes, out buildings, fences and orchards, sell at ten to thirty dollars per acre. Many a superior farm may be had for twenty dollars, and not infrequently a fine estate is offered for fifteen dollars per acre. Wild, wooded tracts are selling at three to ten dollars per acre, and many of these tracts are well watered, and so abundant in blue grass pasture that for sheep and cattle ranges they could hardly be excelled. In the towns commercial and residence properties are selling at very reasonable rates. It is quite noteworthy, too, that good coal lands are selling at the same scale of prices that govern average farm lands.

REYNOLDS COUNTY.

Population, 5,722. Reynolds county is situated in the southeast part of the State; it is bounded on the north by Dent and Iron counties; east by Iron and Wayne; south by Carter and Shannon, and west by Dent and Shannon counties, and contains 494,379 acres. It is a comparatively new county, having been formed from some of the adjoining counties. It is only about one hundred miles south of St. Louis, the greatest city of the West, which now has a population of about 500,000 inhabitants, and affords one of the best markets in the United States.

SURFACE CHARACTERISTICS—SOILS.

The surface of the country is somewhat irregular, rather hilly, interspersed with valleys of rich alluvial soil. The soil is divided into bottom and uplands—the former being a rich alluvial soil, while the uplands are of clay and clay subsoil, producing all the varieties of vegetation that grow in the bottoms, but not in such abundance. Along and near the rivers and principal streams, and intermediate between the bottoms and table or uplands, the country is rough and hilly. There is, however, scarcely any part of the county too rough for good pasturage—especially for sheep walks.

STOCK HUSBANDRY AND CLIMATE.

The winters are unusually short, and stock requires but little feeding, cattle in some portions of the county (except during very severe winters) wintering themselves on that supplied by nature. Hogs are often driven to market and butchered for home consumption off of mast. Cattle, hogs and sheep are raised for market to some extent. Blue grass, timothy, clover, red top, or herd grass, grow well, while the wild grasses afford extensive and excellent pasturage. There being no stock law in this State, cattle can roam at will over the hills.

PRICE OF FARMS.

Improved farms can be bought from three dollars to twenty dollars per acre. Unimproved lands can be purchased cheap.

Crop Report.

The estimate of the acreage of crops is not given. Correspondent reports the average yield as follows:

Articles.	Yield per acre
Cultivated in wheat	7 bushels.
Cultivated in oats	20 bushels.
Cultivated in corn	10 bushels.

RIPLEY COUNTY.

Population, 5,377. Ripley county is situated in Southeast Missouri, on the Arkansas border, one hundred and sixty-eight miles south of St. Louis, seventy-five miles west of the Mississippi river, and within ten miles of the St. Louis, Iron Mountain and Southern Railway.

PHYSICAL FEATURES.

The face of the county is diversified, the bottoms being level, while the uplands are gently undulating—only sufficiently rolling, in most places, to shed the water in wet seasons. Along and near the rivers and principal streams, and between the bottoms and table or uplands, the country is rough, hilly and rocky. There is, however, scarcely any part of the county so rough as not to afford good pasturage.

CHARACTERISTICS OF THE SOIL.

The soil is divided into bottom and uplands; the former being a rich, alluvial soil, confined to the river and creek bottoms, and producing, in large quantities, all the cereals and vegetables that grow in this latitude, while the uplands are of clay and clay subsoil, producing the same variety of vegetation, but not in same abundance. The uplands are better adapted to fruit growing, especially grapes; they are also susceptible of rapid improvement by the fertilizers, as the clay soils hold all the manure put upon them.

STOCK RAISING.

The winters are generally short, and stock requires but little feeding; in some portions of the county the stock passes the winter entirely on the supply of nature. Hogs are often driven to market, well fattened on mast.

AGRICULTURAL RESOURCES.

The average yield per acre of wheat is fifteen bushels; corn, forty; oats, thirty-five; rye, twenty; barley, twenty-two; potatoes, one hundred and twenty-five; timothy, one ton to the acre; and clover, Hungarian and millet, two and one-half tons; tobacco, one thousand pounds, and cotton eight hundred pounds in the seed.

PRICE OF LAND, ETC.

There are quite a number of improved farms for sale at three to eight dollars per acre, as well as large bodies of unimproved land at from two to five dollars per acre, and considerable government and homestead lands. The St. Louis, Iron Mountain and Southern Railroad owns 11,000 acres of rich bottom land, at three to five dollars per acre. There are large bodies well adapted for the location of colonies.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre
Wheat harvested	2,000	5 bushels.
Oats harvested	2,500	25 bushels.
Corn harvested	10,000	6 bushels.

REMARKS.

Extreme drouth.

SALINE COUNTY.

Saline county is situated on the south side of the Missouri river, and a little west and north of the center of the State, and immediately east of the county of Lafayette, the Missouri river forming the boundary on the north and east for a distance of ninety miles. The county has ofttimes received the well merited appellation of the "Garden of Missouri."

SOIL AND PRODUCTIONS.

Its soil is principally a black loam, from two to eight feet deep, underlaid with a porous subsoil, the advantage of which is felt and appreciated by the intelligent farmer, especially in very wet or very dry seasons. For agricultural purposes and stock raising this county is unsurpassed by any in the State. When hemp, that test of good land, was extensively grown in this State, Saline was a large producer. Corn and wheat are the two leading products of this soil, and make large yields. A few years ago a premium was offered for the best ten acres of corn grown in the county, and was awarded to a farmer, who made an average of over one hundred and twenty-four bushels per acre, and seventeen others produced an average of over one hundred bushels per acre; all other cereals, common to this latitude, are successfully and profitably cultivated; considerable tobacco is grown in the northern and eastern parts of the county. Grasses grow to perfection, and a large quantity of hay is made in the county each year. Blue grass is the natural production of all open lands not in cultivation.

Orchards are numerous and fruits fine, such as apples, peaches, pears, cherries, and the smaller fruits of the garden.

SURFACE AND CHARACTERISTICS.

About one-fourth of the land in Saline county is timbered, and three-fourths, prairie land. The timber consists, principally, of the different kinds of oak, walnut, hickory, elm, cottonwood, hackberry, ash, cherry, maple and sycamore. The prairie lands of the county have all been improved.

PRICE OF LANDS.

The average price of improved land is about twenty five dollars per acre; that of unimproved land, about six dollars per acre.

Salt and mineral waters are found in all parts of the county. The great salt spring, eight miles west of Marshall, is probably the largest spring of the kind in the State. Near Brownsville, in the southwestern portion of the county, are situated the Sweet Springs—rapidly becoming, on account of their health-giving properties, a popular summer resort, and may well be called the "Saratoga of the West."

MARKET FACILITIES.

The Chicago, Alton and St. Louis Railroad runs centrally through the county from east to west, entering over the fine steel bridge that spans the Missouri river at Glasgow; the Lexington Branch of the Missouri Pacific crosses the southwestern portion of the county, and the Wabash, St. Louis and Pacific traverses the north bank of the Missouri river, and, by these roads and the river above named, the numerous products of the generous soil find direct, ready and competing markets in the cities of St. Louis and Chicago.

SCHUYLER COUNTY.

Population, 10,470. Schuyler county is located on the northern boundary of the State, sixty miles west of Keokuk, and is crossed by two railroads; one, the Wabash, St. Louis and Pacific, formerly the North Missouri Railroad, running north and south through the county, and connecting St. Paul with St. Louis; the other, the Missouri, Iowa and Nebraska Railroad, running west from Keokuk, passes east and west through the county, and crosses the former road one mile north of Glenwood. In this way all the good markets are easy of access.

PRICE OF LAND.

The county is divided into small farms, and four-fifths of the land is good for farming purposes, with the exception of a small strip located

on Chariton river. Good, unimproved land can be bought on easy terms at five dollars per acre, and improved farms from seven to ten dollars per acre. About one-fourth of the land is prairie.

TIMBER.

Timber is abundant and affords cheap material for farm improvements and fuel.

Water is in an ample supply for all purposes.

SOILS.

The soil is not rich, nor so deep as some Illinois lands, but as the grazing is superb, including the celebrated blue grass, stock-raising is rapidly becoming the ruling industry.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre.
Cultivated in corn	38,880	25 bushels.
Cultivated in wheat	15,550	8 bushels.
Cultivated in oats	19,440	25 bushels.
Cultivated in rye	500	10 bushels.
Cultivated in timothy and clover	40,000	1 ton.
Cultivated in flax	100	6½ bushels.
Cultivated in millet	15,000	

SCOTLAND COUNTY.

Population, 12,507. Scotland county is in the northeastern part of the State of Missouri; borders on the Iowa line, and is situated about forty miles west of the Mississippi river. The county was organized

from a part of Lewis county, on the 19th day of January, 1841, is twenty-one miles square and contains 278,748 acres of land. Her population, in 1850, was 3,782; in 1860, 8,873; in 1870, 10,670, and in 1880 is estimated at 15,000.

The surface of the country is undulating, and consists of about two-thirds prairie, one-sixth table and one-sixth bottom lands. These lands are well drained by the Little Fox, North and south Wyaconda, Bear, Baker, Foreman, North Fabius, Indian, Tobin, Fabius and Middle Fabius creeks, and the south fork of Middle Fabius. These streams are at a convenient distance from each other, and flow from the northwest in a southeasterly direction.

The climate cannot be surpassed. The winters are short and mild, the summers long and temperate, being just the requisites of good health and abundant harvests. There are no malarial diseases. Ague or chills are little known.

The soil is very fertile and productive, the sub-stratum is a brown clay, technically known as the bluff formation, while the upper stratum is a rich, sandy loam.

MARKETS.

There is always a ready market for all products. The Missouri, Iowa and Nebraska Railroad runs through the county from east to west. The taxes are light, the State and county tax together amounting to only one and one-half cents on the dollar, and, besides, the property is not assessed at more than one-third of its true value.

PRICE OF FARMS.

In this county, farms well improved, in excellent localities, and with good buildings, orchards, fences, wells, etc., can be purchased for from fifteen to twenty dollars per acre, medium farms from ten to fifteen dollars per acre; unimproved farms at from three to eight dollars per acre.

SCOTT COUNTY.

Population, 8,587. The county of Scott is situated about 150 miles below St. Louis. It has an area of about twenty-five by twenty miles.

Its eastern boundary is the Mississippi river, affording several excellent landings; its western boundary is the White Water, or Little river. On the north it is bounded by Cape Girardeau county, and on the south by Mississippi and New Madrid counties.

It has an assessed value of taxable property of $1,800,000. It has no bonded debt, and no interest to pay, which makes taxation light The total taxes levied last year amounted to but $1.10 on the $100. It is well supplied with public and private schools, and has churches of nearly all denominations, the Baptists and Methodists being most numerous.

SURFACE CHARACTERISTICS AND SOIL.

It has a great variety of soils—hilly and broken upland, river bottom, level sandy loam, etc.

The last spur of the Ozark Mountains juts into the northern portion of the county, making it hilly and broken. The soil is an admixture of clay and loam, strongly impregnated with lime, making it admirably adapted to the growth of wheat, which is successfully cultivated by frugal, industrious and well-to-do German farmers, who settled here some thirty-five years ago. Wheat from this portion of the county, made into flour at the mills of Cape Girardeau, took the first premium at the Vienna Exposition, and also at the Centennial. The eastern portion of the county, south of the hills, and the western portion, along the White Water, are rich river bottoms, wide in extent and embracing a large area of as rich and productive lands as are found in any country, being black alluvial soil, exceedingly well adapted to the growing of corn, wheat, oats, etc., the various grasses, roots and vegetables.

The central and southern portions are sandy loam, admirably adapted to farming, and yielding a larger return from the same amount of labor than any lands in the State. Its great peculiarity is the ease with which it is cultivated, and the certainty of its crops. It can be plowed immediately after a rain, and the oldest settler here cannot recollect a failure of crops on this character of land. This is accounted for by the fact that the water of the Mississippi percolates through the entire extent of its sandy subsoil, and is constantly ascending to the surface; and, if crops are properly cultivated, they never suffer from drouth. In late years it has been found that the wheat, grown on these lands equals that grown on the hills, both in quantity and quality.

Last year, experiments were made on this soil with the "Early Amber sugar cane," which proved a complete success, although the parties had no previous knowledge of its cultivation, and their appli-

ances for grinding the cane and evaporating the juice were of the rudest kind. The success of last year has induced the planting of a large area this year.

PRICES OF LAND.

The prices of land are very moderate; improved farms can be bought at from ten to twenty-five dollars per acre. The St. Louis, Iron Mountain and Southern Railway Company have a large quantity of fine timber, agricultural and grazing lands in the wild state, which are sold at from two to five dollars per acre. The Scott County Immigration Society will be happy to furnish information to intending immigrants on any of the above points.

TRANSPORTATION FACILITIES.

The transportation facilities are great. It has the Mississippi river along its entire eastern front, the St. Louis, Iron Mountain and Southern Railway runs through its entire length, from northwest to southeast, and the Cairo division of the same road through its southern townships. This creates a good local market for produce, etc. Anything that a farmer has to dispose of can be readily sold at any of the towns along the railroad, or those on the river, at nearly St. Louis prices.

SHANNON COUNTY.

Population, 3,441. Shannon county, Missouri, contains about 1,000 square miles of territory.

TOPOGRAPHY—SOILS—PRODUCTS.

The land may be divided into two classes, tillable and grazing lands. One-third of the land in the county is susceptible of cultivation. The tillable land consists of river bottom, valley and upland. The soil of the first divison is alluvial; that of the second a sand loam; of the third a clay loam. The bottom and valley lands are already rich in the

natural elements necessary to plant for production, and will, therefore, produce abundant crops without the use of manure. The uplands do not produce such abundant crops during the first two or three years of tillage, but when they are properly farmed they prove to be the most lasting lands. There is an abundance of water in the county for any purpose. Current river enters it at the northwest corner, and runs in a southeasterly direction through the county. Jacks Fork of Current river rises in the southern part of Texas county, enters Shannon county about twelve miles north of its southwest corner, and runs in a northeasterly direction, emptying into Current river near the center of the county. These two streams have about ten tributaries, extending in various directions through the county. These streams furnish abundant power for manufacturing purposes. They also furnish ample employment for the followers of Isaac Walton, as they abound in fish of various kinds, such as bass, pike, perch, salmon, sucker, catfish, drum, gar and red-horse.

MINERAL RESOURCES.

The county, besides the resources before mentioned, has undeveloped mineral resources. Iron, copper and lead indications can be seen in many parts of the county. The prospect miner has been here; the man with capital is now demanded to go deeper than a prospect shaft can go. The mineral resources are as yet a reserve fund to be drawn on in an emergency.

TRANSPORTATION AND MARKETS.

The county is about one hundred and seventy-five miles from St. Louis by the usually traveled route. Forty-five miles from Salem, the present terminus of the St. Louis, Salem and Little Rock Railway, a branch of which is now in course of construction to a point near the northern boundary line, forty-five miles from Piedmont, on the Iron Mountain and Southern Railroad.

SHELBY COUNTY.

Population, 14,024. Shelby county offers superior inducements and attractions to immigrants, in the cheapness of its lands, its light taxation, its location, soil, climate, healthfulness, social and other considerations, which go to make life profitable and enjoyable.

It is situated in the northeast portion of the State, and is the second county west of the Mississippi river, on the Hannibal and St. Joseph Railroad, and has an area of 322,560 acres.

MARKETS.

Quincy and Hannibal, the eastern termini of this road, are on the "Father of Waters," and about thirty-five miles from the county line, giving good and convenient markets, and several lines of roads connect these points with St. Louis, Chicago and the East.

WATER SUPPLY.

Salt river runs through its whole extent, from northwest to southeast; and this, with North river, the Fabius, Tiger, Ottar, Crook, and a dozen smaller streams, gives abundant supply of water for domestic purposes.

The timber is principally confined to these streams and cover about one-third of the area of the county, the native forests abounding in oak, walnut, elm, maple, hickory, hackberry and white birch. The rest of the county is almost entirely rolling prairie, with a soil of dark loam, rich in vegetable matter, from eight to twenty inches deep.

SOILS.

In the timber, the surface soil is light in color, especially where grows the largest and finest white oak. The depth and fertility of this soil is indicated by the growth of timber thereon.

PRODUCTS OF THE SOIL.

Next to the grasses, corn is the largest crop; that of 1879 is put down at 250,000 bushels. Oats and other small grains do well. There

is but little outward movement of grain, however, the farmers preferring the more convenient and profitable way of converting it into beef and pork.

Wheat does well on hickory and white oak land, and, with a favorable winter, on the large prairies often yielding twenty to thirty bushels to the acre.

Tobacco is grown to a considerable extent, and the leaf produced is greatly esteemed by the best tobacco manufacturers in the country. About 500,000 pounds are annually shipped from the county.

PRICE OF LANDS.

Lands can be bought at prices that must attract. The best unimproved lands sell at from eight to fifteen dollars per acre, according to location, nearness to the railroad or the towns. Those of inferior quality bring from two dollars and fifty cents to eight dollars per acre.

Improved lands are held at from ten to thirty dollars per acre. The lower price represents fair soil, with moderate improvements; the higher figure, the choice of the county, with fine buildings, orchards, excellent fences, timber and water.

There are still upon the market, at fair figures, several large and valuable tracts of wild land, with splendid prairie and timber range, specially adapted to stock raising.

CROP REPORTS.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	107,449	40 bushels.
Cultivated in wheat	5,228	15 bushels.
Cultivated in oats	10,456	40 bushels.
Cultivated in sorghum	50	80 gallons.
Cultivated in tobacco	300	700 pounds.
Cultivated in timothy and clover	89,411	2 tons.

1881.

Articles.	Yield per acre
Cultivated in corn	18 bushels.
Cultivated in wheat	8 bushels.
Cultivated in oats	20 bushels.

REMARKS.

Drouth, chinch bugs and worms cause of light crops; winter apples a failure.

ST. CHARLES COUNTY.

Population, 26,060. This county, in early times extending indefinitely northwardly and westwardly, has finally been cut down to the limits of 511.57 square miles, equal to 327,404 acres, and is bounded on the east and north by the Mississippi and Cuivre rivers and Big creek; on the south by the Missouri river, and west by Warren county, so that it may readily be seen that the facilities for transportation to market by water are exceedingly favorable. Added to all these conveniences, there is the Wabash, St. Louis and Pacific Railway, and St. Louis and Keokuk Railroad, one running centrally through the county, and the other more to its eastern side, thus affording a ready market for grain and all kinds of produce at every landing on the three rivers, and also at every station on either of the railroads.

MARKET FACILITIES.

The city of St. Charles affords a fair and ready market for all kinds of produce, more especially corn and wheat, in which trade her merchants are all alive and wide awake. Then there is Alton, across the Mississippi river, on the Illinois side, which is a live business city; and

should these marts fail the vender of grain, then just a step from the doors is the great Market of the West—St. Louis. In short, the facilities for reaching market are equal, if not superior, to any county in the State, it being only twenty miles to St. Louis by rock road and railroad, and forty-five miles by water.

SURFACE, CHARACTERISTICS AND PRODUCTIONS.

About one-third of the county is prairie; one-third is cultivated and the balance is in timber—much of it of large size and fine quality. All kinds known to this latitude and climate thrive well, especially along the rivers and their tributaries. Burr oak, walnut, hickory, pecan, white oak, elm, cotton-wood, maple, sycamore, coffee-nut, wild cherry and black oak, may be named as the principal varieties. The county is intersected by numerous streams, the principal of which are: Dardenne, Cuivre and Femme Osage creeks, with their numerous tributaries.

The lands in the west and southwestern part of the county are, in many places, very broken; the upland, comparatively thin, producing good pasturage; but all of the valleys are rich and very productive.

Further east, the lands improve, and produce good average crops of corn, oats and tobacco; wheat does not do so well. Apples and peaches are produced abundantly, and of fine flavor. The land through this hilly or upland region has a shallower soil, underlaid with a red clay, impregnated with iron, and is easily improved by use of fertilizers.

THE MANUFACTURING INTERESTS.

There are several branches of manufactories in St. Charles, such as planing and furniture mills, woolen and yarn factories, saddlery shops and stores, stove and tin shops, lumber yards, etc.

There are six merchant mills in St. Charles, four of which are in operation; also, one in Wentzville, one in O'Fallon, two at St. Peters, one at Hamburg, and one at New Melle. These mills make the best brands of flour, and ship off large quantities, the flour being as celebrated as the wheat and corn of the county.

ST. CLAIR COUNTY.

Population, 14,157. St. Clair county is situated in the northwest part of that section of the State known as Southwest Missouri, and is in the second tier of counties east of the Kansas line. In area it contains 697.14 square miles, making about 446,171 acres. On the assessor's books, for 1879, there are 418,871.72 acres, valued at $1,294,410, and 2,392 town lots, valued at $140,025. The county was first explored in 1827, by Jacob Coonce, but little immigration came here and located until a dozen years later, and the county was not organized until 1841. During the late civil war, St. Clair county was laid in waste, and almost depopulated; hence, its settlement and growth, in fact, dates back but fifteen years. Its population is made up mainly of farmers and stock-raisers.

TOPOGRAPHY OF THE COUNTY—THE CLIMATE.

The county is broken and hilly east and south of the Osage and Sac rivers, beautiful valleys and fertile prairies being numerously intermingled with the timbered uplands. West of Sac river and north of the Osage, the rough country adjacent to these streams is quickly lost in the magnificent prairies which, unbroken, stretch far away hundreds of miles into Kansas. The climate is salubrious. In winter severe weather is of short duration, and in the sheltered ranges, stock frequently go all season without feed, owing to the nutritious grasses which cover the uncultivated portion of the county, among which blue grass is a prominent factor. July and August are usually hot through the day, but sultry nights are rare; and in the warmest periods of weather, heavy and refreshing dews rarely fail to fall during the evenings.

FERTILITY OF THE SOIL.

Containing so many water courses, and these streams bordered by very wide bottoms, a very large per cent. of the land of St. Clair county is unequalled in fertility. The timbered land is a dark loam, black alluvium in the bottoms, and black vegetable mould upon the prairies. The tillable land is very productive, and good crops are raised by the farmers notwithstanding the fact that no special efforts are made to maintain the natural richness of the soil. In the bottoms, along the streams, the yield is fabulous. With proper cultivation crops are seldom a total failure from drouth.

PRICES OF LANDS.

While lands are yet cheap, considering the quality, this state of things will not be lasting. Within the past six months the prices of real estate have advanced at least twenty-five per cent., and are constantly on the increase. Following are the present average figures at which land can be bought: Unimproved prairie, from three dollars to ten dollars per acre; improved land, from ten to forty dollars per acre; unimproved timber, from one dollar and twenty-five cents to ten dollars per acre; improved bottom land, from ten dollars to thirty-five dollars per acre; average unimproved land, five dollars pere acre; average improved land, fifteen dollars per acre.

ST. FRANCOIS COUNTY.

Population, 13,832. St. Francois is the second county directly south of St. Louis, and Farmington, the county seat, is seventy-five miles distant therefrom by county road, and eighty-six miles by railroad. It is bounded on the north by Jefferson, on the east by Ste. Genevieve and Perry, on the south by Madison and iron and on the west by Iron and Washington counties, and contains about 450 square miles, or 380,500 acres.

SOILS—TOPOGRAPHY—PRODUCTION.

The 75,000 acres of land which are in cultivation, produce most excellent crops of all cereals and grasses, as is shown by the general average of shipments and the amount consumed by employes of the large mines and manufactories, while for fruits of all kinds adapted to this climate it cannot be excelled by any county in the State. The general surface of the county is undulating. The extreme southern and southwestern portions are table lands excellently adapted to fruit culture and grazing purposes. The extreme northern portion, along the line of Jefferson county, consists of ridge lands and narrow valleys of dark mulatto soil, and particularly adapted for grape culture and grazing, and produces most excellent wheat, and, withal, has very fine timber

nd inexhaustible mineral wealth, portions of it having been mined for ver sixty years, and are still being extensively mined. The other portons of the county are particularly adapted to agriculture, and all are ell supplied with water from never-failing springs, and drained by lackwell, Rock, Wolf, Black, Indian, Davis, Big Branch, Owl, Doe un and Hazel Run creeks, St. Francois river, Terre Bleue, Big river id Three rivers, streams which afford plenty of water the year round, fering unlimited facilities for driving machinery. The valleys along ese streams are remarkably productive, yielding all kinds of grain, asses and fruits, which richly reward the husbandman for his labor, hile the uplands and divides make returns but little short of the vals, and in which most generally are found fine indications and specieens of minerals with which the county especially abounds.

Blue grass seems indigenous to the soil, and for timothy, herds' ass, orchard grass and clover, the county cannot be excelled. Tobacco s been raised to advantage, in fact, made quite profitable, yielding om 400 to 1,000 pounds, of a very excellent quality, to the acre.

TRANSPORTATION FACILITIES.

The facilities for transportation are quite good. There are fifty iles of railroad in the county. The main line of the St. Louis, Iron ountain and Southern Railway runs through the northern and westn portions of the county, and the Belmont Branch of the same railad extends through the central and southwestern portions of the unty. There is also a narrow gauge railroad in operation from a int on the St. Louis, Iron Mountain and Southern Railway, near ineral Point, to the prosperous mining towns of St. Joe and Desloge, distance of thirteen miles. There is also a gravel road running rough the central portion of the county, from the Ste. Genevieve line y the way of Farmington to Iron Mountain. The above gravel road gether with the numerous public highways, afford all the necessary cilities for transporting exports and imports to and from the railroad.

STE. GENEVIEVE COUNTY.

Population, 10,390. Ste. Genevieve county is one of the tier of unties forming the eastern boundary of the State. It is washed all

along its eastern line by the Mississippi river, and is the most eastern of its second tier below St. Louis county. It is traversed by numerous streams of pure, never failing, limpid water, and is dotted with springs as clear as crystal. Its climate is salubrious and temperate, and free from miasmatic influences or any of those blighting agencies, with which other fertile regions are cursed.

Its population, in 1870, was 8,384, which, during the short space of six years has increased, without any perceptible aid from foreign immigration, to over 10,000.

TOPOGRAPHY AND SOIL CHARACTERISTICS.

The area of the county embraces about 464 square miles, or 297,3[illegible] acres, about one-third of which is under cultivation. Of the remainder more than one-half is excellent farming lands, and could be brought into a high state of tillage by proper exertions. Much of the waste lands of the hills and barrens furnish in a state of nature abundant forage for cattle, sheep, hogs and every species of domestic animals. From the middle of March until the opening of winter, the exclusive dependence of the farmer for pasture for his stock is the "range," and it is no uncommon spectacle to find by the first of June, half-starved cattle of early spring as sleek, fat and handsome in appearance as the stall-fed and pastured beeves of the eastern farmer, and all this solely from the pickings of the range.

LAND PRICES.

Lands of excellent quality, unimproved, can be bought at from $ to $5 per acre; improved from $5 to $50 per acre.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	20,000	30 bushels.
Cultivated in wheat	40,000	15 bushels.
Cultivated in oats	15,000	25 bushels.
Cultivated in sorghum	500	150 gallons.
Cultivated in tobacco	100	1,000 pounds.
Cultivated in timothy and clover	9,200	1 ton.
Cultivated in vineyards	200	200 gallons.

1881.

Articles.	No. of acres	Yield per acre
ltivated in corn	20,000	5 bushels.
ltivated in wheat	30,000	5 bushels.
ltivated in oats	2,000	10 bushels.
ltivated in tobacco	50	
ltivated in apples	500	

REMARKS.

Drouth and chinch bugs have destroyed the crops.

ST. LOUIS COUNTY.

Population, 31,885. In point of wealth and population, St. Louis unty is the second in importance in the State, having a population of ver 31,000. It is more closely settled, perhaps, than any other section country in the State, as it comprises all the outlying suburbs of the eat city of St. Louis, and has not a city of any importance within its mits.

SEPARATION FROM THE CITY.

It is composed almost wholly of suburban residences, and of mall farms and gardens. A large belt of it, adjoining the city limits, nd following the city's boundary, from the Mississippi river north of he city to the river again south of the city, has long since been laid ff and platted into town lots or very small subdivisions for gardening urposes. Up to, and including the year 1876, the city and county of t. Louis were under one county government, and while under the ame government, contracted a large debt for parks and internal im- rovements. Under constitutional authority, by a vote of the people, he two governments were separated, the separation taking effect in

January, 1877. By the terms of the separation, the county was relieved of all debt and became the owner of all property and improvements within its limits.

Since the separation the county has acquired a location for a permanent seat of justice, and has erected a handsome court house and jail at the county seat, which is called Clayton, in honor of the venerable Ralph Clayton, one of the oldest residents, who donated one hundred acres of fine land to the county for use as a location for its county seat. This property has been laid off into town lots, and has become quite valuable, and is being rapidly built up.

St. Louis county is composed of all that portion of the territory of the old county of St. Louis, as organized before the separation from the city.

The city of St. Louis forms a boundary for nearly the whole of the eastern front of the county, and is only about twenty-five miles from the farthest portion of the county.

MARKET FACILITIES.

The county has nearly seventy miles of frontage on the Mississippi and Missouri rivers, and is crossed by the following railways:

Missouri Pacific, St. Louis, Iron Mountain and Southern, Wabash St. Louis and Pacific, St. Louis and San Francisco, Keokuk and St Louis, and West End Narrow Gauge. Along all of these roads that lead into the city, are built beautiful suburban villages, in which are the residences of thousands, who do business in the city, and thus seek quiet homes in the suburbs. The fare on these railways is exceedingly light, and is made less as the population and traffic increase.

PRICE OF LAND.

The very best lands can be had at from fifty to one hundred and fifty dollars per acre, according to location and state of improvements. There are thousands of acres of medium class lands that can be had from ten to thirty-five dollars per acre.

REMARKS.

Estimate of the acreage of crops is not given; correspondent gives the average yield:

Wheat	9 bushels.
Oats	27 bushels.
Corn	10 bushels.

Apples one-third of the usual crop.

STODDARD COUNTY.

Population, 13,432. Stoddard county, Missouri, is situated in the southeastern part of the State, twenty miles from the Mississippi river, opposite the mouth of the Ohio. The county is bounded on the east by Whitewater river, and on the west by the St. Francois. Along the borders of these streams are broad bottoms of highly fertile land, some of which is subject to overflow. The entire central portion of the county, from north to south, consists of rolling uplands.

SOIL.

The soil of the bottoms is a sandy alluvium of great fertility, and well adapted for the culture of cotton. The uplands are of clay loam, suitable for wheat. Corn, potatoes, oats, tobacco and grass grow readily in any part of the county.

WATER.

Castor river and several smaller streams furnish a large amount of stock water. Wells of moderate depth furnish good water in any part of the county.

TIMBER.

The timber of the bottom lands is noted for its size and excellent quality. It consists chiefly of oak, hickory, gum, maple, ash and cypress, with occasional walnut, elm, catalpa, box-elder, etc. The timber of the uplands is of the same species, excepting cypress, but not so large as the timber in the bottoms.

AREA.

The area of Stoddard county is about 700 square miles, or 480,000 acres, of which not over 50,000 acres are in actual cultivation.

RAILROADS.

The Cairo division of the St. Louis, Iron Mountain and Southern Railway passes nearly through the center of the county, from east to west. The Illinois, Missouri and Texas Railroad, extending southwest from Cape Girardeau, on the Mississippi river, will run, for twenty-eight miles, through the northern part of the county. Work is now suspended on this road, but it is expected that it will resume operation at an early day. A party is now surveying a line for a projected railroad from Dexter southward, to be known as the Dexter and Helena Railroad.

MARKET FACILITIES.

Shippers of produce have choice of St. Louis, Chicago or southern markets. The St. Louis and Iron Mountain Railroad Company give specially low rates from Dexter. As an item, it may be mentioned that cotton is shipped to St. Louis at seventy-five cents per bale. The merchants of Dexter and Bloomfield generally pay St. Louis prices less freight, for all kinds of produce. Supplies of all kinds required by farmers can be bought at about the same prices as elsewhere in Missouri and in Illinois.

LAND.

The tillable land of Stoddard county is owned mostly by citizens. The St. Louis and Iron Mountain Railroad Company own about 30,000 acres of good upland. Most of the bottom lands outside the settled portion of the county belong to non-resident owners, who offer their land for sale at low prices through resident agents. The titles of all lands can be readily ascertained from the land records, which are all preserved; besides this, a firm in Bloomfield has a complete abstract of title of all lands in the county. Good farming land can now be bought at from three to five dollars per acre, and improved farms at from five to ten dollars per acre.

STONE COUNTY.

Population, 4,429. This county is located in the extreme southwestern part of the State, on the Arkansas border.

SOIL AND SURFACE CHARACTERISTICS.

The soil is a rich, red loam, except the river bottoms, which are alluvial. In the extreme northern part the soil of the immediate surface is light and ashy, but the loam is found at the depth of a few inches. Proceeding towards the southern line of the county, the surface soil is a dark, vegetable mould, with the red loam underlying it at a depth of forty or fifty feet. The alluvium on the river bottoms varies from a few inches to twenty feet in depth, and in productiveness is unsurpassed.

The unimproved lands of the entire county are covered with quite a heavy growth of timber—this narrow northern belt being more or less densely supplied with scrub oak, black-jack and a species of dwarf hickory. In the south the timber becomes heavier, the chief varieties being oak, hickory, black and white walnut, elm, maple, linden, sycamore, locust, and many other kinds of lesser growth. The prevailing timber is oak, of which there are seven or eight varieties, the most abundant of which are the black and white oak, both valuable for lumber, as are also the post oak, chinquapin and burr oak, the last found chiefly on the bottoms, sometimes four or five feet in diameter. The hackberry, though not very abundant, is found here, and is very valuable for lumber. Red cedar abounds, and in the southern part of the county there is a prolific supply of yellow pine, the value of which needs no comment.

It will be seen from the above that there are no prairie lands in the county; though in the extreme northern part, there are level or gently undulating stretches of land, that seem as if they might have been prairies at some former period.

The portion of cultivated land in this county to the uncultivated, is probably not more than one acre in twenty.

After leaving the northern line of the county a few miles, going south, the surface of the country becomes gradually more and more hilly, until the southern boundary is approached, when the hills be-

come little less than mountains. And throughout the county there is comparatively but little land in cultivation, except what lies in the river bottoms and on the lesser streams. Yet these uplands, rough and stony though they are, have a rich, deep soil, and if devoted to the raising of fruit, especially grapes, would soon be among the most valuable lands in the country. These hills are now covered with wild grape vines, the fruit of many of which has as fine a flavor as the most celebrated grapes in the gardens of the north and east. These lands can now be had at from one dollar to two dollars per acre. When the advantages of this county are better and more widely known, intelligence and industry from abroad will come and cover these hills with pleasant homes, and orchards, and vineyards, where now are only the barrenness and desolation of untamed nature.

PRICE OF FARMS.

There is a large amount of public lands in the county—many thousand acres. Improved farming lands can be had at from ten to twenty dollars per acre, according to location. The price of unimproved land is stated above. But there are thousands of acres here that can be had under the homestead law, which brings the land down to about eighteen cents per acre.

MARKET FACILITIES.

As yet, no railroad traverses the county, but the St. Louis and San Francisco Railroad, which runs close to the northwestern boundary affords ample shipping facilities, and the home markets are good and reliable.

CROP REPORT.

1881.

Articles.	Yield per acre
Average yield of wheat	15 bushels.
Average yield of oats	25 bushels.
Average yield of corn	25 bushels.

REMARKS.

Acreage of crops not given by correspondent. About half the usual average on account of drouth.

SULLIVAN COUNTY.

Population, 16,569. Sullivan county lies in the northern part of the State, and is separated from the State of Iowa by Putnam county on the north, and is bounded on the east by Adair; on the south by Linn, and on the west by Grundy and Mercer counties.

RAILROAD FACILITIES.

Sullivan county has two railroads in active operation—the Burlington and Southwestern running through the county from north to south, the northern terminus being Burlington, Iowa—and on the south, connecting with the Hannibal and St. Joseph Railroad at Laclede, in Linn county. The Quincy, Missouri and Pacific Railroad extends from Quincy, Illinois, to Milan, the county seat of Sullivan county, which is the present terminus of the road; the last above named road furnishing direct communication with all points east.

SCHOOLS AND CHURCHES.

This county has about one hundred public schools, with an efficient force of good teachers, and an ample school fund for their support. There are about twenty-five churches in the county, nearly all the denominations being represented.

COUNTY FINANCES AND RATE OF TAXATION.

The county is in a good shape, financially, county warrants being at par, and paid on presentation to the treasurer. The rate of taxation is about $1.40 on the $100 valuation—this being the total for all purposes. The indebtedness of the county is about $80,000—consisting of subscriptions to the capital stock of the Burlington and Southwestern Railroad.

PHYSICAL FEATURES AND PRODUCTIONS.

The surface is undulating, but not mountainous—about two-fifths of the entire area (414,500 acres) being timber, the residue being prairie land of a fine quality. The timber is chiefly oak (of all varieties), hickory, walnut, elm, linn and cottonwood. The streams are Main Medicine, West Locust, Main Locust, East Locust, Yellow Creek and Spring Creek, all but the last being tributary to Grand river—Spring

Creek being tributary to the Chariton river. In the timber regions, stone of excellent quality is found—both sand and limestone being of fine quality.

VALUE AND QUALITY OF LANDS.

Excellent improved farming lands can be bought at from five to seven dollars per acre, good pasture lands at from two to five dollars per acre. Improved farms sell now at from seven to eighteen dollars per acre, according to quality, improvements and location; but all grades of land are advancing rapidly. The general quality of the soil is a black, sandy loam, varying in depth from two to ten feet, and is very productive.

TANEY COUNTY.

Population, 5,633. Taney county is bounded on the north by Christian county, on the east by Ozark county, on the south by the State of Arkansas, and on the west by Stone county.

The face of the country is very broken and hilly, but interspersed with numerous valleys. These valleys are, with a few exceptions, small, but are well watered by fine streams which pass through them to White river. Many fine farms are found in these valleys in a high state of cultivation. Upland farms are often added to the valley farms, and the combination of the two make excellent homes.

Timber grows in abundance in these valleys, and the hills and uplands are covered with a heavy growth of excellent timber for fencing and building purposes.

In addition to the valley farms, there are found upland and ridge farms. The county in many places possesses large tracts of flat land which make good homes and the very best of stock farms.

The markets are not, as yet, of the best character, Springfield being the nearest railroad point, and of course, the natural market. The home market, however, is very good, and everything that is raised can be sold very readily.

Crop Report.

1881.

Articles.	No. of acres.	Yield per acre
Wheat harvested	1,000	5 bushels.
Oats harvested	1,000	7 bushels.
Corn harvested	20,000	15 bushels.
Tobacco harvested	300	400 pounds.
Apples harvested	800	

Remarks.

Cotton is a staple, but the yield this year is only about one-third as much as usual.

TEXAS COUNTY.

Population, 12,219. Texas county, which is situated in the south central part of the State of Missouri, is abundantly supplied with pure springs of living water, which gush forth from its hillsides and rise from the beds of its valleys, the surplus being carried off by its numerous water-courses, which flow north, south, east and west.

The principal streams which take their rise in the county are: Big Piney and Roubidoux, which flow northerly into the Gasconade; Big creek and Jack's Fork of Current river, which flows in a southeasterly direction to Black river, and North Fork of White river, which rises in the southwestern part of the county, and flows in a southerly direction to White river, in Arkansas.

SOIL AND TIMBER.

Along the banks of these streams and their numerous tributaries, which form a perfect net-work over the entire surface of the county, may be found the deep black soil of the "bottoms," which, in their

natural State, are generally quite heavily timbered with a mixed growth of walnut, sycamore, oak, cherry, elm, sugar maple, hackberry and buckeye, or horse-chestnut, with an abundant undergrowth of wild plum, red bud, paw-paw, spice wood, crab-apple, etc. When put into cultivation, this makes the best of land for corn.

Rising in terraces above the valleys, comes the "bench land," or "second bottoms," which have a soil of deep clay or sandy loam, and are usually covered with black oak, hickory, hazel and sumac. These lands are well adapted to general agriculture, but especially to the production of clover and grasses of various kinds, for hay and pasturage.

Above this, again, is found the "ridge land," which possesses a soil similar to that of the "bench lands," and is particularly adapted to the production of the different kinds of "small grain," and to fruit culture. The timber on the ridges consists chiefly of the different varieties of oak, occasionally interspersed with hickory, while there are also some fine belts of pine extending in different directions across the county.

The largest body of pine in Texas county extends from the Big Piney, near Houston, in a northeasterly direction to the head of Big creek and Current river, in the eastern part of the county, and thence eastward across Shannon county. There is also a very good belt of Pine timber between Jack's Fork and Pine creek, in the southern part of the county while in the southwest the county corners in the edge of a great pine region, which extends in a southwesterly direction through Howell, Douglas and Ozark counties to the State line of Arkansas. There are steam saw-mills located in various parts of the county, at which lumber may be purchased at from seventy-five cents to one dollar per hundred feet, and where those having timber may dispose of it. Fuel and fencing material is more than abundant, as Texas is one of the best timbered counties in the State.

RAILROADS.

There are no railroads yet built within the limits of Texas county, but, with the present revival of business, there is a strong probability of the construction of two roads, if not more, at some time in the near future. There is, however, no difficulty in finding a quick market for farm produce.

PRICE OF LANDS.

The immigrant will be able to find lands for sale in this county at almost any price, according to location and improvements.

VERNON COUNTY.

Population, 19,382. Vernon county forms a portion of what is known as Southwest Missouri. It contains 838 square miles, and is bounded on the north by Bates county, on the east by Cedar and St. Clair, on the south by Barton, and on the west by the State of Kansas.

PHYSICAL CHARACTER.

The whole surface of the county is rolling and undulating, with occasional irregular mounds rising above the general level of the country. It has about one-fifth timber to four-fifths prairie. The water courses are remarkably well distributed over the county. The bottoms of the larger streams are generally wide. The prairies are small, so that it is almost impossible for any one to locate over three or four miles from timber.

CLIMATE AND HEALTH.

The climate is genial, as the latitude indicates. The winters are mild and short, and the snow-fall is always light and remaining only a day or so. The heat of the summer is not oppressive, as a refreshing breeze prevails. The county is noted for its general healthfulness, as there are absolutely no local causes for disease.

RAILROADS.

The Missouri, Kansas and Texas Railway is already in operation, running diagonally through the county, with depots at Schell City, Walker, Nevada, Ellis Station, Deerfield and Clayton. It does an immense business, and brings the people of the county in connection with the commercial centers of the country. The Laclede and Fort Scott Railroad is a chartered projected route, which runs through the county, east and west, on which a considerable amount of work has already been done. This line will, without doubt, be built in due course of time

VALUE OF LAND.

The unimproved lands can be had at from four to ten dollars per acre, prices varying according to quality and distance from railroad stations. The improved lands vary in price, according to the amount and value of improvements. Now is an excellent time to invest in real estate of every character. The recent pressure in financial matters and business energies of the country has had the effect to bring the price of real estate, in this county, down to the lowest possible figures.

Crop Reports.

1880.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	92,600	40 bushels.
Cultivated in wheat	87,000	12 bushels.
Cultivated in oats	12,000	25 bushels.
Cultivated in castor beans	20,000	
Cultivated in flax	10,000	12 bushels.
Cultivated in sorghum	500	
Cultivated in tobacco	100	
Cultivated in timothy and clover	400	
Cultivated in vineyards	100	

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	76,000	5 bushels.
Cultivated in wheat	18,000	3½ bushels.
Cultivated in oats	20,000	26 bushels.
Cultivated in castor beans	6,500	4 bushels.
Cultivated in flax	5,000	3½ bushels.
Cultivated in tobacco	600	600 pounds
Cultivated in apples	4,000	2 bushels.

WARREN COUNTY.

Population, 10,806. Warren county is situated on the north bank of the Missouri river, about sixty miles by its winding course from its confluence with the Mississippi. The latter stream, at the mouth of the Cuivre river, approaches to within twenty miles of the northeastern corner of the county, and from thence flows in a tortuous course a little southeast, a distance of some forty miles, to where it joins the Missouri. Its area is 400 miles square. The northern portion of Warren county is drained by Camp creek and Camp branch (of Big creek), Big creek, Indian Camp creek, tributaries of the Cuivre river, and Peruque and Dardenne creeks. The southern portion is drained by Bear creek, Massees creek, Smith's creek, Tuque and Lake creeks. The waters of the north side flow an average distance of about thirty miles to the Mississippi, while on the south side the length of flow does not average more than ten miles. The line dividing the northern from the southern water-flow traverses the county in a very irregular, but generally southeastern course, and is nearly coincident throughout its whole distance with the line dividing the prairie lands from the timber lands proper. All of the south side of the county, from the Missouri river to the summit of the dividing ridge, with small exception, was originally covered with forest, very dense and heavy, as the river was approached; becoming more sparse and of less thrifty growth on the ridges, where, when exposed to the fires that annually swept over the prairies, all timber not protected by water courses was destroyed. The northern portion of the county, comprising about one-third of its area, and about one-half of its tillable surface, is called the prairie, and is interspersed with groves and belts of timber along its streams, equal, almost, in extent to the prairie proper. This prairie country is beautifully undulating, and the fringes of forest skirting the heads of the streams, and extending out into the prairie lands, now nearly all in cultivation, and dotted with comfortable, substantial farm houses, contribute background to as delightful landscape pictures as could be desired.

Nearly the whole of this northern portion of the county is susceptible of cultivation. The soil of the prairies is adapted to corn, oats, rye, and, in some portions of it, wheat, grapes, sorghum, broom-corn, and, with proper fertilizing, tobacco. The soils of the timber lands are

recognized, however, as better adapted to the growth of wheat, tobacco, potatoes and turnips. In the creek bottoms, of which character there is a large area in this portion of the county, all of the before named crops grow luxuriantly. The southern side of the county furnishes the greatest diversity of soil, from the summits of the narrow ridges to the rich, deep and inexhaustible alluvium of the Missouri bottoms, and there is an equal diversity of physical conformation. These beautiful hills and valleys are almost entirely subjected to the plow, and yield such annual harvests as makes the husbandman rejoice. The "bluff" formation characterizes the belt lying between the river bottom and the hills, still covered by the "drift;" and on the line of division are found, very frequently, the denuded rocks that have for ages past, and will for ages to come, resist the erosive forces that were cut down and carried away, to form the floor of future continents, all of that vast pile, once lying contiguous and filling up the space, miles in width, between the opposite bluffs of the great river.

THE MISSOURI BOTTOM.

This level belt of land has an average width of about two and a half miles, and extends the whole length of the county and State. Once covered with forests of immense growth, it is now nearly all in cultivation, and produces corn in the greatest luxuriance, and is especially adapted to the growth of hemp and all other crops that flourish in alluvial soils. Wheat does well here also, but the bluff is regarded as the especial soil for the perfection of this cereal. Tobacco flourishes on the lands near the river bottom, and along the creek valleys adjacent.

VALUE OF LANDS.

The actual value of lands in Warren county ranges from as low as one or two dollars for the most broken and poorest soils, to seventy-five dollars per acre, and perhaps even more, for the best located river and bluff farms. Good farms can be purchased for from ten to twenty-five dollars per acre in the prairie; and timber lands, susceptible of being made into good farms, somewhat broken, but such as would be thought level enough in some countries, can be bought at from four to eight dollars per acre. This class of lands offers real inducements to persons of limited means wishing to engage in farming at a small expense for beginning.

MARKETS.

The proximity to markets makes farming profitable. Small fruits, poultry and eggs, vegetables, and all that class of products which are enhanced in value by being placed on the market in the freshest condition, can here be produced profitably. The facilities for reaching the market consists in the Missouri river, by which much of the grain is sent to St. Louis from the southern portion, the Missouri Pacific traversing the south bank of the river the whole length of the county, and the Wabash, St. Louis and Pacific Railway running through the northern portion. The distance from Warrenton, the county seat, through which the latter road runs, to St. Louis, is fifty-eight miles. An accommodation train is run on this road, which leaves Warrenton in the morning and returns in the evening, by means of which persons having business can spend some six hours in the city.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre
Cultivated in corn	42,000	7 bushels.
Cultivated in wheat	50,000	11 bushels.
Cultivated in oats	25,600	20 bushels.
Cultivated in rye	500	10 bushels.
Cultivated in flax	500	5 bushels.
Cultivated in tobacco	200	500 pounds.

REMARKS.

Severe drouth and chinch bugs.

WASHINGTON COUNTY.

Population, 12,895. Washington county is located in Southeast Missouri, fifty miles south of St. Louis, and forty miles west of the Mississippi river. Was organized August 21, 1813. Total area, 150,866 acres; two-thirds tillable, one-fourth valley and bottom lands; 25,000 acres of mineral and 35,000 acres pine lands in cultivation.

SURFACE, CLIMATE AND SOIL.

The surface is broken and hilly. Climate mild and healthful. The soil of the valley and bottom lands is a rich black loam; fine for corn and grasses. The uplands are a clay loam, superior for wheat, grass, oats, tobacco, fruit, etc.

The mineral lands are not valuable for their mineral alone, but much of it is superior farming land, covered with heavy timber, and held at from five to thirty dollars per acre.

RAILROADS.

There are twenty-four miles of railroad traversing the eastern border, having eight shipping points, at one of which were loaded and unloaded 1,231 cars of bulk freight in 1878.

MARKETS.

St. Louis, and sometimes the South, affords the markets, but, with the exception of a few staple articles, the home market is equal and often superior to the St. Louis market. That is one of the strong points.

PRICE OF LANDS.

Unimproved property is held at one to fifteen dollars; improved at five to thirty dollars per acre, according to location and improvements.

CROP REPORT.

1881.

Articles.	Yield per acre.
ultivated in corn	12 bushels.
ultivated in wheat	6 bushels.
ultivated in oats	20 bushels.

REMARKS.

Estimate of acreage for 1881 not given by correspondent.
Drouth the worst ever known; chinch bugs bad.

WAYNE COUNTY.

Population, 6,068. Wayne county is situated in Southeast Mis-ouri, and is bounded on the north by Iron and Madison counties; on ie east by Bollinger and Stoddard counties; on the south by Butler nd Ripley counties, and on the west by Carter and Reynolds counties.

RAILROAD FACILITIES.

The St. Louis, Iron Mountain and Southern Railway passes hrough the western part of the county, from the northern to the south-rn limits, a distance of nearly forty miles.

SOIL AND PRODUCTION.

The land is chiefly limestone, and what is known in the Eastern tates as "gravelly"—is highly productive, and yields, with indifferent ultivation, bountiful crops of corn, wheat, oats, rye, tobacco and the arious grasses, and all kinds of fruit usually grown in this latitude, uch as apples, peaches, pears, plums, cherries, grapes, etc., and all inds of vegetables.

THE PRICE OF LAND.

Land is low and within the reach of any man who is honest and industrious, and the aid of a generous and large hearted people will be extended to all who come to this favored country, with the purpose and intention of making it their home, and aiding, by their means, or by their muscle, in the development of its vast and varied resources.

CROP REPORT.

1881.

Articles.	No. of acres.	Yield per acre
Wheat harvested	10,000	8 bushels.
Oats harvested	4,000	18 bushels.
Corn cultivated	10,000	20 bushels.

REMARKS.

Drouth very severe; chinch bugs doing but little damage.

WEBSTER COUNTY.

Population, 9,094. Webster county, organized in 1855, is situated in the southwestern part of the State, in 37° 15′ north latitude, and 15° 45 west longitude from Washington. It is bounded on the north by Laclede and Dallas counties; east by Wright, south by Christian and Douglas, and west by Greene, and has an area of 380,000 acres.

PHYSICAL FEATURES AND STREAMS.

The county is partially prairie, the balance well timbered, some of it broken and hilly, but the greater part susceptible of cultivation.

In the southeastern portion of the county the Niangua and Osage fork of the Gasconade find their source. The streams run through the entire length of the county, from twenty to thirty feet wide, two to eight reet deep, and a current of three miles an hour. The James and Finley rivers also rise in the southeast, and traverse the entire width of the county, running in a western and southwestern direction, from twenty to forty feet wide, with a current of from two and a half to three miles per hour. The Pomme De Terre river rises in a large spring in Pleasant Prairie, one mile west of the county seat, runs six miles west, then northwest through the county. The numerous tributaries of these streams furnish an abundance of water for stock and manufacturing purposes, while never-failing springs of purest water may be found on almost every quarter section in the county.

SOIL AND AGRICULTURAL PRODUCTIONS.

There can be found in this county almost every variety of soil, from the poorest post oak flat to the rich, black loam and limestone. The bottom lands are rich and very productive, but second to no lands in the county is what is called the "barrens." It is upland, but covered with a growth peculiar to bottom lands, and is equally as productive as the bottom lands. All the products of the soil grown in the States farther north, are produced here in abundance, including many of the semi-tropical productions. Tobacco of the very finest quality is grown in larger quantities than in any county of Southwest Missouri. Grasses of all kinds do well. Since the county has been put in communication with the markets of the world, considerable attention has been paid to wheat-raising, to which this soil seems peculiarly adapted. In many instances several crops of winter wheat have been grown on the same ground with an ever increasing yield. A failure of the staple crops from drouth, grasshoppers, or any other cause, has never been known to the oldest inhabitants.

RAILROADS.

The St. Louis and San Fracisco Railroad passes through the county from east to west, some twenty-five miles of the road being in the county. The money has already been raised to pay for a survey through the county, from north to south, of the Sedalia, Warsaw and Memphis Railroad. It is proposed that this road shall enter the county on the north center, and run south, crossing the St. Louis and San Francisco Railroad at Marshfield, the county seat.

PRICE OF LANDS.

There are about 250,000 acres of land entered and subject to taxation. Improved lands can be bought at from five to twenty dollars per acre. There are some 78,000 acres of railroad land, which can be purchased on seven years' time, at from two to eight dollars per acre, with seven per cent. interest. There are 18,000 acres of school lands, which can be bought from the county at from fifty cents to one dollar and fifty cents per acre—one-third of purchase money cash, the balance on as long time as the purchaser desires, provided the interest is paid annually. There are also 8,000 acres of college land, offered at from two to five dollars per acre, on eight years time, with six per cent. interest. Still 26,000 acres of Government lands here are subject to entry, at one dollar and twenty-five cents per acre, or which may be homesteaded.

WORTH COUNTY.

Population, 8,208. In the extent of its area Worth is the smallest county in the State, containing only 174,720 acres. It is not, however, the smallest in point of population and wealth. Of the 114 counties in the State some thirty have a smaller number of inhabitants and less intrinsic worth than little Worth. But the primary object of this article is briefly and accurately to describe the advantages and resources of the county; hence comparisons are for the present laid aside.

TOPOGRAPHY—SOIL.

Worth county lies sixty miles east of the Missouri river, in what is known as the famous Upper Grand River Valley. Its altitude is 1,000 feet above the tides, and is embraced in one of the finest corn and grazing regions west of the Mississippi. The county is well watered from small rivers flowing southward through it, besides their numerous tributaries. The water courses are generally deep set and rapid, which gives ample drainage. The streams are well wooded with oak, hickory, ash, elm, walnut, cottonwood and maple, giving an admirable

distribution of timber to each and every portion of the county. The distribution of timber and prairie land is excellently adapted to the necessities of the people for years to come. The soil is of a rich, dark, vegetable loam on the prairies, while in the valleys and bottoms it is black alluvium. The sub-soil is porous and quickly absorbs moisture, and is almost proof against drouth. This is a superior advantage which this section of country justly claims.

AGRICULTURAL RESOURCES.

As a farming country Worth has no superior. Winter and spring wheat do well here, yielding from fifteen to thirty bushels to the acre, according to season and culture. Corn is the great staple, growing from forty to one hundred bushels per acre. Oats, rye, barley, flax-seed, millet, broom corn, sorghum, etc., grow in great profusion. The soil seems to be especially adapted to the growth of these productions. Fruit of every description grows here almost spontaneously; grapes especially are at home in this climate. Native grasses flourish here in their beauty, covering the prairies with their rich verdure. Of the domestic grasses, blue grass is in the lead, and is fast fighting its way to the front. Red clover and timothy attain a wonderful growth.

RAILWAYS.

The railway facilities of the county will shortly be unsurpassed by any north of the Missouri river. The Chicago, Rock Island and Pacific Road runs conveniently on the east; the Chicago, Burlington and Quincy, and the Kansas City, St. Joseph and Council Bluffs roads form a terminus at Hopkins on the west, distant only twelve miles from the western boundary line of the county. Only twenty-two miles south runs the great through line of the Wabash, St. Louis and Pacific. The Leon, Mount Ayr, and Southwestern Road from Mount Ayr, Iowa, to Grant City, the county seat of Worth, was recently completed, and will soon reach St. Joseph. It is a branch of the great railway system of the Chicago, Burlington and Quincy Company, and is designed to connect with the Santa Fe Road either at St. Joseph or Atchison. After the extension of this branch to a connection with the Santa Fe Road, it will be the great through line for freights between Chicago and the southwest, thus giving Worth county both a northern and a southern market.

WRIGHT COUNTY.

Population, 9,738. Wright county lies wholly within that belt of country called Southwest Missouri. Its north boundary is exactly at 37° 3″ north latitude, and the county court house is located nearly at 92° 30″ longitude, west, from Greenwich.

FACE OF THE COUNTRY.

It is generally known by those who are at all versed in the physical geography of the State, that its surface may be described as a broad, undulating plateau, from which projects a series of hills and ridges, extending from Ste. Genevieve to the southwest, and into which the branches, creeks and rivers, have worn their deep, broad channels and valleys. Besides the local undulations of this vast plateau, some portions of it are much higher than others, as evidenced by the course of the streams.

The highest part of the State, south of the Missouri river, is a high divide, extending from Greene county, through Webster, Wright, Texas, Dent, Iron and St. Francois counties. The western part of this region —including Webster, Wright, Texas and Dent—is a broad table-land, possessing numerous undulations, which give the country its rolling character, and numerous valleys and ravines, which render it more or less rough and broken. These valleys, worn by the streams, constitute an important feature in the physical structure of this region, as they exert a very material influence on the climate, and give many acres of the richest bottom lands.

Along the larger water courses of this county, the surface of the country, on one or the other side of the stream, is much broken by abrupt hills, rising in some instances to a considerable height above the general level; but, away from these streams, the surface is but moderately broken.

CHARACTER OF LANDS.

The lands of the county, fit for cultivation, may be divided into three general classes, viz: Alluvial bottoms, valley lands and ridge lands. Lands of the first class named are, of course, found along the

larger water-courses, and are more productive of certain crops than those of either of the other classes. Being, as they are, analogous to the rich bottom lands of other sections, and at the same time so universally known as to quality, their description is by no means demanded. Lands of the second class are found between parallel ridges, and they universally concenter on the larger water-courses, like the limbs of a tree on the trunk. These lands, in their nature, differ but little from those of the first class. They are generally a little thinner of loam, and not so deep in soil. Lands of the third class occupy the heights of ridges walling the valleys. They are, so to speak, small table-lands, and differ from the lands of either of the other classes, in that they have purely clayey foundations, and possess, comparatively, an inappreciable quantity of the natural marl, or fertilizing element, so abundantly given to those others, especially to the first. Among the citizens of the county occupying these different classes of lands, respectively, it is an open question as to which of the three is the most valuable, all in all, for agricultural purposes.

Of the 494,000 acres comprising the area of the county, 300,000 are estimated as fit for agricultural purposes, if not a greater proportion. These 300,000 acres are as nearly as can be estimated, distributed among the three classes of lands above mentioned, in the ratio of five acres of bottom lands to ten and fifteen acres of valley and ridge lands, respectively. Of this area, about 95,000 acres (a little less than one-third of the whole) are at this time in cultivation—so that within the limits of this county, a population of more than three times the present number may be supported from agricultural pursuits alone, even under the very inferior system of tillage now prevailing among a considerable majority of the farmers.

RAILROADS AND COUNTY ROADS.

Within the boundaries of the county there are no railroads at present. The surveyed line of the contemplated Kansas City, Fort Scott and Memphis Railway, passes east and west through the southern portion of the county, and it is the opinion of those best informed, that this road will be in process of construction within the next two years; if so, the county will soon experience a change for the better, the like of which has never been known by the people.

Within seven miles of the northwest corner of the county, the St. Louis and San Francisco Railway passes. The most accessible depot on this road; and the one to which goods are mainly shipped from St. Louis, is at Marshfield, Webster county, distant twenty-five miles from Hartsville, the county seat.

Crop Report.

Estimate of acreage not given. Average yield for 1881 is as follows:

Articles.	Yield per acre.
Wheat	6 bushels.
Oats	25 bushels.
Corn	12 bushels.

Remarks.

Drouth and chinch bugs doing great damage.

MISSOURI SOILS.

BY G. C. SWALLOW, LL. D.

HOW FORMED.

When the surface rocks are hard like granite and limestone, the process of their decomposition and formation into soils is a very slow one. The heat and the frosts, the rains and the snows, so slowly decompose the rocks and furnish the materials, that thousands of years are consumed in forming a soil of sufficient depth for agricultural purposes; and, besides, soils thus formed are dependent upon the underlying rocks for their fertility, and are usually soon exhausted by cultivation.

But the mills of the gods do not always grind so slow. Streams of water, bearing in their currents sands, and rocks, and ice, grind the rocks more rapidly, and mingle the materials of different formations, and soon form the deep, rich soils of our alluvial bottoms, as shown in the valleys of our large rivers; and likewise the finest and best of the materials thus produced are borne on by the streams into the lakes and gulfs, where they are spread over the bottom, to form the best possible soils when the waters are drained off, as is well shown in those portions of Holland reclaimed by draining the sea of Haarlem and some ninety lakes.

But glaciers are the most powerful of all agencies for grinding up the rocks and distributing the materials thus produced. Flints and other hard rock, frozen into the ice of the glacier and pressed down and forward by the great weight of the ice, cut and break and crush

with an irresistible power. Such a mill is the great glacier of Mt. Fairweather, which takes its rise at an elevation of 17,000 feet, sweeps down the mountain slope, (making its growth and cutting its teeth), and then moves off to the ocean, a distance of 50 miles, in a stream of ice 8 miles wide and 300 feet deep.

Such is one of the immense mills which are now grinding up the rocks of Alaska, bearing the debris to the Pacific, and spreading it over the bed of that ocean, for the soils of a future continent.

But this is a small mill, compared with that which ground the grist for our Missouri soils out of the rocks to the north and west of us.

During the *drift period*, an immense glacier swept down from the north, over all North America to about the latitude of St. Louis where its progress was stayed by the warmth of our genial suns. This huge glacier continued to plow up and grind the rocks of the north, and bear the debris southward, until all the States and Territories north of this latitude were covered to depths varying from 1 to 500 feet. When the warmer suns melted this vast field of ice, a lake was formed covering Northern and Central Missouri, Eastern Kansas, Southeastern Nebraska, Southern Iowa, and a part of Illinois. Into this lake the Missouri entered above Omaha, the Platte and Kansas from the west, and the Des Moines and the Mississippi from the north. These and other streams which flowed into this lake, were fed by tributaries which washed every acre of the vast region between the Mississippi and the Rocky Mountains, and the Saskatchewan and the Red river of the North, to the Ozark Highlands on the south. Every rain washed out the best and finest materials of the glacial ground rocks, and every stream bore the precious freight into the lake and spread it over the bottom to depths varying from 20 to 200 feet; and, besides, this whole region was covered with vegetation and peopled with animals, as now. Herds of bison, elk, and deer roamed over the prairies, and droves of elephants and mastodons browsed in the forests. And, as these plants and animals decayed, their carbons and phosphates and humates were borne to our lake with the mineral debris of the rocks, and helped make up the bluff formation, the basis of our Missouri soils.

DEPTH OF SOIL MATERIAL.

Some are skeptical when told that our soils are fertile to the depth of a hundred feet, but the mode of formation, as above described, clearly proves that the soil must be fertile to the depth it was formed in the lake, and that the first formed, or the deepest, will be quite as good as the top, save what has been added to the top by decaying plants and animals since the lake was drained off.

PROOF OF FERTILITY.

In proof of the great fertility of the bluff formed over Missouri in this lake, we can appeal,

1st. To similar soil in Europe reclaimed from the Haarlem and Baltic Seas, and from a vast number of lakes. To soils thus formed Holland owes its vast fertility, and Holstein its large, fat cattle.

2d. To the fertility of this formation when taken at great depths, as has been shown in numerous instances of excavations at St. Louis, Kansas City, Weston, St. Joseph, and numerous other places. At Weston, in 1853, corn grew to the height of 15 feet on soil taken from a depth of 75 feet. At Kansas City the roots of the pokeberry at a depth of 17 feet, and the roots of the white oak at a depth of 65 feet, were found.

3d. To the numerous instances where exhausted soils have been rendered fertile by plowing up the subsoil, or the bluff marls underlying the soil.

At the College farm, old fields, so exhausted by 50 years' culture that they produced little besides mullein and sassafras, have been rendered fertile by plowing up the underlying bluff marls. In one experiment, such an exhausted field has produced excellent corn crops for 13 successive years, with no fertilizers save the subsoil of the bluffs.

In other experiments with wheat in similar exhausted fields, the wheat has been cultivated for five and six successive years. The first year it yielded less than five bushels; but has steadily increased under deep culture, until the last year the yield was twenty-five bushels, thus increasing its yield five bushels per year, with no fertilizers and no extra culture save the sub-soiling to stir up the bluff marls so abundantly spread over Missouri by the agencies above named.

4th. To the chemical analyses of this lacustrine deposit, which show its great wealth of plant food.

An analysis made by Prof. Paul Schweitzer of a sample taken from the University Campus at Columbia, twelve feet below the surface, gave in one hundred parts: Silica, 77.7061; ferric oxide, 3.0772; manganic oxide, 0.2314; alumina, 10.2391; lime, 0.3788; magnesia, 0.2722; soda, 1.5250; potassa, 0.5750; phosphoric acid, 0.0214; carbonic acid, 0.6426; water, 5.7363; total, 100.4051.

Other analyses show the presence of Chlorine and Organic matter. This analysis, and others made by Dr. Sitton, show how much of each element of plant food there is in each foot in depth of Missouri soils.

The following amounts are contained in each acre for every foot of soil and subsoil at the depth indicated:

	First foot. No. of pounds.	Second foot. No. of pounds.	Third foot. No. of pounds.	Twelfth foot No. of pounds.
Lime	19.166	16.117	29 494	26 484
Magnesia	13.329	30.927	18.184	18.118
Potash	18.810	32.234	17.418	40 423
Soda	7.157	7.405	11.348	104.544
Chlorine	.405	.429	.664	not known.
Phosphoric acid	12.868	11.157	13 996	1,491 000
Sulphuric acid	8.180	2.990	4.051	not known.
Organic matter	269.686	253.381	142 310	42 737

Silica and alumina are not given in the table, as those elements are found in vast abundance in all our soils ranging from fifty to ninety per cent. of the whole.

The above table shows an amount of the elements of plant food often exhausted from the soil by cropping, and restored to it by manures or artificial fertilizers, at great expense; but the farmer will find here such vast quantities of plant food, that the soils are practically inexhaustible.

To show the money value of this store of plant food in the subsoils of all these lands, we may reckon the commercial value of the phosphoric acid for a single foot in depth on one acre. The second foot of these soils, that is the subsoil, from the depth of one foot to two feet in every acre, contains 11,157 pounds of phosphoric acid, which, at ten cents* a pound, would cost $1,115.70.

The next foot below, that is from two to three feet in depth, contains in each acre 13,996 pounds of phosphoric acid, which would cost, in commercial fertilizers, $1,399.60.

Thus it will be seen that the phosphoric acid alone, in two feet only of the subsoil, would cost $2,515.30 per acre.

If we should calculate the commercial value of the other fertilizers, such as potash, soda, sulphuric acid, chlorine and organic matter found in these subsoils of a single acre, and if we should extend the calculation to the depth of ten feet only, the result would be somewhat startling.

*Phosphoric acid is valued at 12½ cents in commercial fertilizers.

But this calculation is not made on a single analysis of a single soil in one locality, but from many analyses made of soils collected as fair samples of the lands in all parts of Northern and Central Missouri during the thirty years I have had these soils under examination.

From these facts we learn a cheap mode of keeping our soils productive.

If the surface soil be exhausted, set the plow a little deeper and you will restore more plant food than a most liberal dressing of fertilizers would give.

If the organic matter be exhausted, a crop or two of clover plowed in will make good the loss and restore the soil to its primitive fertility.

Hence the farmer will find beneath the soil of Central and Northern Missouri from five to two hundred feet of the very best soil materials, which the natural forces have ground from the rocks of the surrounding country and spread with lavish hand over our State. Here is a deposit from which the farmers of a hundred generations may draw at will, and with which he can raise all the products of the temperate zone without the use of costly fertilizers.

He, therefore, who owns a farm in Missouri, underlaid with such an inexhaustible supply of plant food, has an everlasting inheritance, which, with the use of a little brain and muscle, he may convert into an abundance of this world's goods.

THE TOBACCO LANDS OF MISSOURI.

By G. C. Swallow, LL. D.

There are eighty-six counties in the State which have successfully produced tobacco, but for various reasons many have never entered into the business on an extended scale. The want of transportation has prevented some; the settlers in others have preferred to produce other staples; while still others, once largely engaged in tobacco culture, have found other crops more profitable since the growth of our cities and railroads have made better markets, and since the sale and manufacture of tobacco have been so limited and restricted by the revenue laws; but it has been clearly shown that all the counties named have large areas of soil admirably suited to the culture of this staple.

It will save much time and space to arrange these counties into *Groups* or *Districts* for the description of the topography, geology and soils which have produced good crops of tobacco.

In order to secure a similarity of topography, geology and soils in each, it will be necessary to make eleven groups, as follows:

First Group comprises sixteen counties on or near the Missouri river in the western center of the State—Buchanan, Platte, Clay, Clinton, Caldwell, Ray, Carroll, Chariton, Howard, Cooper, Saline, Lafayette, Jackson, Cass, Moniteau and Pettis.

Second Group comprises fifteen counties between the Missouri and Mississippi rivers in the northern half of the eastern center of the State—Marion, Shelby, Macon, Randolph, Monroe, Ralls, Pike, Audrain, Boone, Callaway, Montgomery, Lincoln, Warren, St. Charles and St. Louis.

Third Group comprises eight counties in the northern center of the State—Gentry, Harrison, Grundy, Sullivan, Linn, Livingston, Daviess and DeKalb.

Fourth Group comprises three counties on the south side of the Missouri river in the eastern center of the State—Osage, Gasconade and Franklin.

Fifth Group comprises twelve counties on or near the Mississippi river in the eastern part of the south half of the State—Washington, Jefferson, Ste. Genevieve, St. Francois, Iron, Reynolds, Shannon, Madison, Bollinger, Wayne, Stoddard and Oregon.

Sixth Group comprises eight counties on or near the southern boundary of the State—Carter, Ripley, Howell, Douglas, Ozark, Taney, Stone and Barry.

Seventh Group comprises five counties in the southwestern center of the State—Greene, Lawrence, Newton, Jasper and Dade.

Eighth Group comprises six counties in the eastern part of Southwest Missouri—Texas, Wright, Webster, Laclede, Dallas and Pulaski.

Ninth Group comprises four counties on or near the western boundary in the western center of south Missouri—Bates, Vernon, St. Clair and Cedar.

Tenth Group comprises four counties on the Mississippi in Southeast Missouri—Scott, Mississippi, New Madrid and Pemiscot.

Eleventh Group comprises five counties in the northeastern corner of the State—Lewis, Clark, Scotland, Schuyler and Knox.

As these groups differ in size so they differ in their geology, topography and soils in their adaptations to the culture of tobacco.

The *First Group* of fourteen counties comprises an area of some 5,000,000 acres of the best soil on the continent for general agricultural purposes, and it can be safely said there is none better for tobacco.

Topography.—The country occupied by this group of counties is a plain with a rolling surface and a gentle declivity to the south and east. Through this plain the Missouri, Platte, Grand, Chariton, La-Mine, Blackwater and the Blue rivers have cut their valleys through the surface rocks to the depth of some two hundred feet, while the numerous smaller streams intersect all parts of the district with channels deep and wide in proportion to the water discharged. The undulations and channels of the streams furnish a complete drainage.

Geology.—The coal measures underlie this whole region, save portions of Saline, Cooper and Howard, where the subcarboniferous, devonian and selurian rocks successively appear, but all these consolidated strata are so deeply covered by the quaternary deposits, that they have little or no influence on the soils.

Above the consolidated rocks just named, this whole district is covered with thick beds of glacial, lacustrine, terrace and alluvial formations. The glacial strata of boulders, sands and clays, are sparingly

developed and rest upon the coal measures and the older rocks where they come to the surface; but they are so buried beneath the lacustrine strata known as bluff, that they exert very little influence on the soil. Boulders and pebbles are not known in the soils of this district. The surface deposit of all the upland district, is the bluff, which varies in thickness from a few feet to two hundred as at St. Joseph. At Kansas City the streets are cut through it to the depth of seventy-five feet.

This bluff deposit is very similar to the famous loess of the Rhine, and is rich in lime, magnesia, potassa, soda, phosphoric acid, chlorine, carbonic acid, silica and alumina.

The bottom prairie or lower terrace and the aluvial formations are similar in composition to the bluff save the material is coarser and more porous.

Timber and Prairie.—This first district is about equally divided between the timber and prairie; the timber occupied the larger area in the river bottoms and the prairie in the highlands.

Soils.—From the above description of the surface rocks of this district, it is obvious the upland soils were formed of the bluff marls, and the bottom soils of the bottom prairie and alluvial formations of the river valleys. There are several distinct varieties of soil distinguished by the grasses and weeds in the prairies and by the trees in the forests.

1. *The Hackberry Land* has the best upland soil. It is rich, deep, light and porous. The growth is hackberry, elm, wild cherry, honey locust, coffee tree, pig-nut, hickory, chestnut and burr oak, black and white walnut, mulberry, linden and paw-paw.

The chemical properties of our soils very closely correspond to the indications of the natural products, as shown by chemical analyses. These analyses are given to compare the chemical properties with the natural products of our soils, and to show what plant food they contain.

Analysis of soil No. 1, from hackberry lands in Platte county.

"Soil No. 1 A," 8 inches below the surface, and "No. 1 B," 18 inches below the surface. Of 100 parts, dried at 100° C., it contains:

	Soil No. 1 A.	Soil No. 1 B.
Organic matter and water	5.6470	4.2936
Insoluble in acid, silica, etc	88 1600	84.2900
Chlorine	0 0075	0.0050
Sulphuric acid	0.0000	0 0300
Silica (soluble)	0.3131	0.2940
Peroxide of iron	2 5185	4.6680
Alumina	2.5309	4.5968
Lime	0.6205	0.5153
Magnesia	0.5262	0.7875
Alkalies as chlorides	0 6670	0.6705
Phosphoric acid	1.1965	0.1817

2. The *crowfoot lands* of the prairie region have soils very similar in quality to the *hackberry lands*, and these two soils generally join each other where the timber and prairie lands meet.

Analysis of soil No. 2, crowfoot land in Saline county. No. 2 A was taken six inches below the surface, and No. 2 B, eighteen inches below the surface. This soil had been cultivated in hemp.

	No. 2 A.	No. 2 B.
Chlorine	0.0091	0.0071
Soluble silica	0.3811	0.2798
Alumina	3.1774	3.8890
Peroxide of iron	2.5554	3.0067
Lime	0.4732	0 3293
Magnesia	0.4522	0.4454
Potassa	0.2950	3.3293
Soda	0.1305	0.0353
Carbonic acid	0.1370	.0727
Sulphuric acid	0.0287	0.0269
Phosphoric acid	0.2354	0.3424
Water 150° C	0 5093	0.5787
Organic matter	6.1872	5 0633
Insoluble in acid	84 5890	85.2967

These soils form the best tobacco lands when both quantity and quality are taken into the account. They occupy at least 1,250,000 in this district, and yield from 1,000 pounds to 2,000 per acre.

The productive and durable qualities of this soil are surpassed by none in the country. It has sufficient sand for the water to drain off rapidly in wet weather, and enough of clay, lime, magnesia and humus to retain the moisture in the dry. The subsoil absorbs all plant food from the water that percolates through it.

These productive powers are well illustrated in the gigantic forests and luxuriant grasses produced by it.

White oaks grow upon it 29 feet in circumference and 100 feet high; linden 23 feet in circumference and 100 feet high; burr oak and sycamore grow still larger.

Herds of buffalo, elk and deer were entirely concealed from the hunter by the tall prairie grasses of the crow-foot lands.

3. *Elm lands* are but little inferior to the hackberry. The name is derived from the American elm, which grows so large and abundant in the magnificent forests of these lands.

The principal growth is elm, hackberry, honey locust, black walnut, cherry, blue ash, black oak, red bud and paw-paw.

Analysis of soil No. 3, from elm lands in Marion county. No. 3 A, six inches below the surface, and No. 3 B, eighteen inches below the surface.

	No. 3 A.	No. 3 B.
Chlorine	.0072	.0035
Sol. silica	.1445	.1769
Sulphuric acid	.0577	.0438
Phosphoric acid	.1023	.0944
Carbonic acid	1.0190	.1453
Peroxide of iron	2 5310	3.2920
Alumina	2.3931	3 6884
Lime	.5430	.2939
Magnesia	.4365	.5654
Alkalies as chlorides	.2696	.4281
Water at 150° C	1.0920	.....
Organic matter	5.4500	4.3270
Insoluble in acid	87.0720	87.1869

4. *Resin-weed lands* of our prairies have about the same qualities of soil as the elm lands above described.

Soil No. 4. A, was from resin-weed land, six inches below the surface. Soil No. 4 B, was from the same place, eighteen inches below the surface. This soil had been cultivated in hemp.

	No. 4 A.	No. 4 B.
Chlorine	.0084	.0085
Sol. silica	.3080	.2842
Sulphuric acid	.0126	.0202
Phosphoric acid	.3309	.2155
Alumina	2 4205	4.1500
Peroxide of iron	2,3200	3.1810
Lime	.3688	.4558
Magnesia	.3006	.5283
Potassa	.3134	.3926
Soda	.1222	.0639
Insoluble in acid	86.8100	85.7260
Organic matter	5.5600	4.1751
Water at 150° C	.4300	.7629

The materials of these soils are a little finer and the soils themselves a little more compact than Nos. 1 and 2, but the heavy forests and luxuriant prairie grasses and chemical properties clearly indicate their great fertility. The bluff on which they are based fully sustains their durability. A grape vine growing on this soil was 22 inches in circumference and 180 feet long, and an elm 22 feet in circumference and 90 feet high.

Hemp, tobacco, corn, wheat and other staple crops grow luxuriantly, and all kinds of fruits adapted to the climate, do well on this soil.

The *Elm* and *resin-weed* lands are interspersed with the *hackberry* and *crowfoot* land in this first district, and are highly esteemed for the culture of tobacco. They yield of this staple from 900 pounds to 1,800.

5. *Hickory land*, hold the grade next to the elm lands, and are characterized by a growth of shell-bark hickory, black, red and laurel oaks, sugar maple, persimmon, dogwood, red bud and crap-apple. This soil is not so deep, has a subsoil more impervious, and the underlying marls have less sand and more clay than the elm lands.

Soil No. 5, *hickory land* from Scotland county. No. 5 A, from 2 to 8 inches below the surface, and No. 5 B, from 18 to 20 inches below.

	No. 5 A.	No. 5 B.
Silica (soluble)	.0830	.0818
Peroxide of iron	3.4596	4.0557
Alumina	4.9748	6.2499
Lime	.3834	.2268
Magnesia	.4543	.4735
Potassa	.6124	.4692
Soda	.3096	.2492
Chlorine	.0072	.0115
Sulphuric acid	.0302	.0182
Phosphoric acid	.1908	.1416
Water at 150° C	1.1407	1.0548
Organic matter	7.8316	5.2267
Insoluble in acid	81.3985	81.7739
Total	100.3811	100.0225

There are large areas of prairie in the northern, northeastern and southwestern parts of the State, which have soils of about the same character and quality as these hickory lands. This variety of soil is sometimes called "mulatto soil."

Soil No. 6, from the farm of Col. M. G. Singleton, Grand Prairie, possesses about the same qualities as the hickory lands.

No. 6 A, 2 to 8 inches below the surface. No. 6 B, from 10 to 12 inches below, and 6 C, from 18 to 20 below the surface of the virgin prairie.

	No. 6 A.	No. 6 B.	No. 6 C.
Soluble silica	.1966	.1639	.1010
Peroxide of iron	2 9576	4.1244	2.8933
Alumina	4.6789	5.7829	3.9593
Lime	.3066	.2067	.2185
Magnesia	3066	.4016	.4600
Potassa	.3264	.3925	.3443
Soda	.1401	.1662	.1684
Chlorine	.0093	.0061	.0082
Sulphuric acid	.0210	.0340	.0327
Phosphoric acid	.0680	.0301	Trace.
Water at 150° C.	.7525	1.0016	1.3248
Organic matter	7.2672	5.6284	7.2869
Insoluble in acid	83.6330	82.4517	82.7504
Total	100.6627	100.4001	99.5428

Though these soils are inferior to Nos. 1 and 4, they are still very productive and highly esteemed for corn, wheat, grasses and fruits. They are much cultivated in tobacco, and they yield from 800 pounds to 1,200 per acre.

The *hickory* lands cover small areas in the counties of the First District.

Such are the soils which cover the high lands, and those of the river bottoms are no less important. They present two varieties, *bottom prairie and bottom timber*, on which much tobacco is raised. They are sandy, porous and vastly productive in wheat, corn, hemp, and yield from 1,000 to 2,000 pounds of tobacco.

Bottom prairie has a light, rich, deep, dark and productive soil, clothed with luxuriant native grasses, among which a species of sorghum is conspicuous. Before these savannas were pastured, the grasses grew to a height varying from five to ten feet.

Soil No. 6, virgin bottom prairie, from General Sterling Price's farm in Bowling Green Prairie, Chariton county.

No. 6 A, 2 to 6 inches below the surface. No. 6 B, from 10 to 12. No. 6. C, from 18 to 20, and No. 6 D, from 30 to 36 inches below the surface.

	No. 6 A.	No. 6 B.	No. 6 C.	No. 6 D.
Soluble silica	.2012	.1792	.2152	.1144
Alumina	3.2074	3.5016	3.4468	3.0391
Peroxide of iron	2.0442	1.9716	2.0467	2.0608
Lime	.5484	.4754	.4213	.4574
Magnesia	.4921	.2000	.2108	.2788
Potassa	.3188	.4766	.4185	.2665
Soda	.2042	.1588	.0831	.1736
Sulphuric acid	.0726	.0764	.0774	.0615
Phosphoric acid	.3874	.2716	.2018	.2142
Chlorine	.0068	.0082	.0057	.0102
Water at 150° C	.7077	.9658	.9254	.5081
Organic matter	4.4185	3.6491	2.2621	2.1731
Insoluble in acid	87.3756	87.9796	89.3720	90.8520
Total	99.8799	99.9139	.....	100.2290

7. *Bottom timber* is based on the alluvial formations, and has a deep, porous and rich sandy soil, which produces a gigantic growth of elm, sugar maple, white ash, cherry, locust, linden, sweet gum, buck-eye, burr, red Spanish, swamp and scarlet oaks, thick shell-bark hickory, hackberry, pecan, black walnut, plum, catalpa and mulberry. Grape vines, trumpet and Virginia creepers, poison oak and cirstarea climb the highest trees and mingle their scarlet and purple flowers and fruits with their highest foliage.

The fertility of this soil is well attested by its chemical properties and the large trees grown upon it. The following, among other samples, were measured in 1857:

	Circumference.	Height.
*Sycamore	43 feet.	65 feet.
Catalpa	10 feet.	90 feet.
Cypress	29 feet.	180 feet.
Cottonwood	30 feet.	125 feet.
Black walnut	22 feet.	110 feet.
Spanish oak	26 feet.	90 feet.

Soil No. 7 is from a cornfield in the high bottom opposite the mouth of the Ohio river, in Mississippi county. It had been cultivated several years. Analysis gave the following ingredients:

Ingredients.	
Soluble silica	.1331
Peroxide of iron	.2385
Alumina	3.2864
Lime	1.8897
Magnesia	.9708
Potassa	.4372
Soda	.1679
Sulphuric acid	.3002
Phosphoric acid	Trace.
Water at 150°C	.4554
Organic matter	6.2199
Insoluble in acid	84.7782
Total	100.5586

These soils, Nos. 6 and 7, cover nearly all the river bottoms in the First District, and are most highly esteemed for the culture of tobacco, corn, hemp and wheat. Bowling Green and Wyaconda prairies in the Missouri bottom, in Chariton and Carroll counties, have been noted for

*This sycamore was broken off at the height given. Others near and not so large were 130 feet high.

large crops of tobacco. The high bottoms are equally productive, and yield vast crops of corn, wheat and hemp. The crops of tobacco usually range from 1,000 pounds to 2,000 pounds per acre.

Such are the soils which cover more than 400,000 acres in this First District. They make it one of the best tobacco districts in the country even without the exhaustive fertilizers so much employed in other parts of the country.

Buchanan reports tobacco among her staple products and leading exports.

Platte has a soil unsurpassed for the production of tobacco, and once produced large crops; but the revenue laws and other causes have turned the farmers to other departments of husbandry.

Clay, like Platte, has a soil peculiarly adapted to the production of tobacco; but for several reasons her farmers give more attention to other staples. The late crop was estimated at 26,800 pounds, an average of 1,000 per acre.

Clinton reports 300 acres in tobacco, and an average crop of 1,800 pounds per acre.

Caldwell reports tobacco as one of the varied products of her rich soil.

Ray produced 300,000 pounds with an average yield of 1,000 pounds per acre.

Carroll planted 1,000 acres and cured 1,000 pounds per acre.

Chariton grows large quantities of tobacco. In some years the crop has reached 15,000,000 pounds.

Howard has produced large quantities of excellent quality. The crop sometimes reaches 2,000 pounds per acre. There are several factories in the county.

Cooper reports tobacco among the leading products of the country. Not much raised now.

Saline produces large crops of this staple.

Lafayette makes tobacco an important export. In some years she sold as much as 600,000 pounds.

Pettis sold 40,000 pounds in 1876.

Moniteau raised 150,000 pounds in 1850.

Jackson reports tobacco among the products of her rich soils. 724,800 pounds in 1877.

Cass produces good crops; but little attention has been given to its production.

This district might produce large quantities of tobacco without materially neglecting other products. Such is the adaptation of climate and soil, and the facilities of transportation, that high prices could quickly stimulate an increased production. Each county could easily raise half as much as the largest crops of Chariton, or 100,000,000 pounds in the whole district.

Second group of counties or *District*, including Marion, Shelby, Macon, Randolph, Monroe, Ralls, Pike, Audrain, Boone, Callaway, Montgomery, Lincoln, Warren, St. Charles, St. Louis and Moniteau, covering an area of 5,737,279 acres situated between the Mississippi and Missouri rivers, in the northern half of the eastern center of the State.

Topography.—The Second District occupies the space in the forks of the two great rivers of the Mississippi Valley. From the mouth of the Missouri the country gradually rises along the dividing ridge to the northwest, and from this water-shed it slopes gently to the Mississippi river on the east and to the Missouri on the south. The whole is intersected and drained by numerous streams tributary to the rivers above named. The general surface is undulating with abrupt declivities to the larger streams.

Geology.—The geology of the Second District is much more varied than that of the First. The strata below the *quaternary* or surface deposits, are *coal measures*, *subcarboniferous*, *devonian*, *upper* and *lower silurian.*

The *Coal Measures* are made up of argillaceous shales, bituminous shales, sandstones, and a few strata of limestone, which make a rather poor, wet and cold soil. These rocks occupy a portion of every county in the district, probably one-quarter of the whole area.

The *Subcarboniferous* rocks are limestones, save a few thin strata of shales and one bed of sandstone. These rocks form a rich calcareous soil, and they occupy large areas in every county in the district.

The *Devonian* rocks are limestones, shales and a few thin strata of sandstones. They form good soils save where the shales are predominant. These rocks cover considerable areas in the district.

The *Upper Silurian* strata cover small areas only in two or three counties, and have but little influence on the soils of the district.

The *Lower Silurian* rocks are magnesian limestones and a few thin strata of argillaceous shales and hornstone. These rocks make a very rich, warm calcareo-magnesian soil. They cover large areas in the counties on the Missouri and Mississippi rivers. In a few small

areas the shales of the *Hudson river* rocks have formed soils too tenacious and wet for tobacco.

But the *Quaternary* deposits so completely cover the rocks above described that they have very little influence on the soils, save along the bluffs of the streams and the more broken portions of the district: so that only very limited areas have soils made from the underlying consolidated strata. Of the soils thus formed, the calcareo-magnesian along the bluffs of the Missouri are the most extensive. These warm, rich soils produce a superior article of tobacco.

The *Drift* is well developed in the northern counties of this district, but much more sparingly in the southern. It has but little influence on the soil since it has burned so deep beneath the bluff on the highlands and the alluvium in the river bottoms. The drift is interesting as containing the gold deposits of this district.

The *Bluff* covers all the uplands of this district, (save the few areas mentioned above) to depths varying from five feet to one hundred. Consequently the upland soils are based upon and derive their mineral character from it.

To show the value of this formation as a soil-maker and as a subsoil, the following analysis of a portion from Boone county taken at a depth of twelve feet on hickory lands, may be useful:

Ingredients.	Depth, 12 ft.
Silica	77.7061
Ferric oxide	3.0772
Manganic oxide	0.2314
Alumina	10.2317
Lime	0.3738
Magnesia	0.2722
Soda	1.5250
Potassa	0.5753
Phosphoric acid	0.0214
Carbonic acid	0.6425
Water	5.7363
Total	100.4951

Portions of this formation taken from Marion and St. Louis counties gave a much larger percentage of lime and magnesia, and the analyses of the subsoils given above will show the properties of the bluff in other counties of the State.

The alluvium and *bottom prairie* formations underlie all the bottom lands and form the basis of their soils. These formations are so nearly alike there is no need of separating them in considering their effects on the soils.

Soils.—This district is about equally divided between prairie and timber, and a considerable portion of it lies in the river bottoms.

Hackberry lands occupy too limited areas in this second district to materially affect its character as a tobacco country.

Elm lands occupy considerable areas in Marion, Monroe, Boone, Ralls, Pike, Callaway and St. Louis, and smaller ones in all the other counties.

The composition and general character of this durable and productive soil is given in the description of the soils of the first district on page 285.

Resin-weed land also occupies considerable areas in the prairie regions adjacent to the elm lands in the timber. The clearing up and cultivation of these lands have removed the natural growth of trees, weeds and grasses which indicated the quality of these soils, but the crops produced on them fully sustain their early reputation for fertility.

Hickory lands and *prairie lands* of the same quality are found in all the counties of the district and occupy fully one-third of the upland. The analyses and general properties of these soils are given in the descriptions of the soils of the first district, page 288.

The hickory lands of this district are interspersed with and adjacent to the elm lands, and they pass by imperceptible gradation from the one to the other. Both soils produce large crops of good tobacco.

White oak lands occupy ridges where the lighter materials of the soil have been washed away. They sustain a growth of white and black oak, shell-bark and black hickory, dogwood, sassafras, redbud and fragrant sumac.

Soil No. 7 is from a white oak ridge in Boone county; No. 7 A, from two to six inches below the surface; No. 7 B, from ten to twelve, and No. 7 C, from eighteen to twenty below the surface of the virgin soil:

	No. 7 A.	No. 7 B.	No. 7 C.
Water expelled by drying at 150° C.	0.4105	0.8030	0.6558
Organic matter & water not expelled at 150° C	3.0957	3.8901	2.6049
Silica, etc., insoluble in hydrochloric acid	90.1420	85.0571	90.8063
Soluble silica	0.1384	0.2187	0.1475
Alumina	3.0654	4.7672	2.9346
Peroxide of iron	2.0553	3.8814	2.0590
Oxide of manganese	a trace	a trace	a trace
Lime	0.2086	0.4722	0.1349
Magnesia	0.3423	0.6581	0.2048
Potash	0.3368	0.3895	0.2121
Soda	0.1828	0.1220	0.2925
Phosphoric acid	0.0560	0.0556	0.0346
Sulphuric acid	0.0085	0.0099	0.0508
Chlorine	0.0000	0.0276	0.0000
Total	100.0873	100.3524	100.1311

The surface soil of these white oak lands is not so rich as the last named variety, but the subsoil is better than the surface, as is shown by the above analyses of this soil at different depths. The No. 7 B, taken from the depth of ten to twelve inches, shows more organic matter, lime, potash and magnesia than No. 7 A does, taken from a depth of two to six inches below the surface in the primitive forest.

This condition of the soil is doubtless due to the removal of the lighter portions of the surface soil by the rains through the ages of its formation, and it shows the benefits to be derived from deep plowing.

This soil occupies considerable areas in the counties of this district and a large part of the tobacco is raised on white oak lands. The yield ranges from six hundred to one thousand pounds per acre, and the quality of the staple is better, as a rule, than that produced on richer lands.

Bottom prairie land.—Only small areas of this soil is found in Marion, St. Charles and perhaps other counties of the second district.

An analysis and description of this soil was given in treating of the the soils of the first district, page 290.

Bottom timber land covers large areas of the river counties and yields the largest crops of tobacco produced in the district.

An analysis and description of this valuable soil is given above, page 291.

Many of the counties in this district formerly produced large quantities of the narcotic staple, but in late years the farmers have found other crops more profitable and their tobacco barns have been left to decay.

Callaway formerly produced from 1,000,000 to 1,700,000 pounds per annum.

Boone county has produced from 1,000,000 to 2,000,000 pounds. It still grows considerable crops, runs three factories and ships direct to England.

Marion produced last year 300,000 pounds, much less than in former years.

Monroe had 25,000 acres in tobacco, with an average yield of 800 pounds per acre.

Shelby is credited with 527,000 pounds.

St. Charles has fine tobacco factories, but produces less of the staple than formerly. In 1862 the production was 350,000 pounds and 50,000 in 1880.

St. Louis was once engaged in raising tobacco, but the growth of the city and an increased demand for food products have turned the attention of the farmers to other staples.

Montgomery reports only twenty-five acres in tobacco, with a yield ranging from 500 pounds to 1,000.

Macon reports a crop of 3,500,000 pounds in 1876.

Pike raised 500,000 pound in 1877.

Lincoln reports an average yield of 800 pounds per acre, and the best quality of golden leaf grown on the white oak soils.

Randolph reports an average yield of 1,000 pounds. The crop of 1876 was 3,000,000 pounds.

The Third District comprises eight counties in the northern center of the State, Gentry, Harrison, Grundy, Sullivan, Linn, Livingston, Daviess and DeKalb, including an area of 2,877,235 acres.

Topography.—This is a high, gently undulating country, declining a little to the south, and is intersected and drained by Grand river and its tributaries. It is the famous *Grand river country*, one of the most beautiful, healthy and productive regions of the globe. The timber and prairie are well interspersed in proportion of about one of timber to three of prairie.

Geology.—The entire district is underlaid with *coal measures*, but these rocks are so deeply buried beneath the bluff that its sands, boulders and clays have but little influenc on the soils.

The *bluff* covers all the upland of the third district to the depth of ten to thirty feet. It is the basis of the soils and furnishes their mineral ingredients.

The *bottom prairie* and the *alluvium* underlie all the bottom lands and form the mineral ingredients of the soils of the river bottoms.

Soils.—It will be seen by the geology that the soils of the third district are formed upon the bluff, the bottom prairie and the alluvium, three formations rich in all the mineral elements of soils.

Elm lands and resin-weed land occupy a large area of this group of counties. Their great fertility will be seen by the analyses and descriptions on page 285. These soils in the third district are deep, black, warm and virtually inexhautible, since they rest on the rich marls of the bluff formation.

Hickory lands and the equivalent prairie soils cover large areas. These soils are described on page 288. They are very much esteemed in this district for tobacco and corn and wheat.

White oak lands are interspersed with the hickory lands and cover considerable areas. These lands are light and warm, and produce fair crops of the very best tobacco raised in this district.

The bottom lands, whether prairie or timber, produce heavy crops of tobacco and other staples.

All the counties of the third district have soils most admirably adapted to the production of tobacco. There are, indeed, very few acres in the whole district not suited to the production of this staple.

Gentry reports 50,000 acres in tobacco last year. It might easily have 100,000 acres in this staple, should it pay as well as other crops.

Gentry formerly raised large crops, but the farmers have generally given their attention to other lines of husbandry.

Harrison reports a crop of 20,000 pounds only for last year.

Linn reports a crop ranging from 800 to 1,000 pounds per acre. The area planted is much smaller than in former years. Whenever the prices justify, large areas are planted, and good crops of excellent quality are produced.

Livingston is as well adapted to the production of tobacco as the adjoining counties, and reports a crop of 1,471,998 pounds in 1875.

Daviess county reports good success with tobacco in the timber. But comparatively little has been planted since the farmers have had their attention called to other staples.

DeKalb is as well adapted to the culture of this staple as the neighboring counties, but has for some cause given comparatively little attention to it.

Sullivan reports good success with the small quantities cultivated.

The high winds which sometimes sweep over this district from the western plains, often prove injurious to the tobacco grown on the exposed prairies. This injury has sometimes been prevented by planting alternate belts of corn as windbreaks.

The fourth district comprises four counties, Cole, Franklin, Gasconade and Osage, on the south side of the Missouri in the eastern center of the State, including an area of 1,491,007 acres.

Topography.—The surface was an undulating plane, but the Missouri, Osage, Gasconade, Meramec and other streams have cut through it deep, broad valleys, usually bounded by abrupt and mural bluffs. In places the ascent to the plane above is by gentle acclivities.

Geology.—The geology of the fourth district is very different from that of the three already described. The consolidated strata are the magnesian limestone series of the lower silurian system. This series is made up of sandstones and magnesian limestones containing many beds and nodules of flint.

The bluff is well developed on the bluffs of the streams and is spread more sparingly over upland portions of the district.

The alluvium is spread over the valleys of all the large streams.

Soils —The soils of the fourth district are somewhat different from those of the districts already described. There is very little hackberry, crow-foot, elm, or resin-weed land in this district.

Hickory lands prevail to a limited extent, but more or less modified, and passing into one or the other of the following varieties:

White oak lands prevail on the ridges leading to the Missouri bluffs, and in some of the interior parts of the counties. The adaptation of this soil to the production of a good quality of tobacco has been fully tested in this district.

Post oak lands.—These lands occupy the broad, flat ridges away from the river bluffs, where the bluff formation is so changed as to be much more compact and argillaceous, and less calcareous and sandy. The growth is post oak, with very few black and Spanish oaks, hickory, red-bud and dog-wood.

These lands cover large areas and are highly esteemed for tobacco and other staples. It will not prove so durable as the soils already described.

Magnesian limestone soils are based upon and largely derived from the magnesian limestone series, or mineral bearing rocks of southern Missouri. They produce a great variety of trees and shrubs, among which black and white walnut, black gum, elms, sugar maple, honey locust, rock-chestnut, scarlet laurel and white oaks, ash, hickory, buckeye, hazel, dog-wood, haws and grapes are often conspicuous.

Soil No. 9, from a magnesian limestone slope in Callaway county:

Organic matter and water not driven off at 158° C.	9.6299
Water expelled by heating to 150° C.	1 1700
Silica, etc., insoluble in hydrochloric acid	54 2600
Soluble silica	0.1639
Alumina	10.8588
Peroxide of iron	2.5186
Manganese	a trace.
Lime	8.0729
Magnesia	1.6609
Potasta	1.6378
Soda	0.3442
Carbonic acid	10.1111
Sulphuric acid	0.0605
Phosphoric acid	0.0950
Chlorine	0.6053
Total	100.5880

This soil is dark and warm, and rich in lime, magnesia and humus. It is productive, durable and well suited to withstand the droughts of our summers.

These lands occupy the slopes, hillsides and narrow valleys of the fourth district, and have a high reputation for the production of excellent tabacco.

Cole county reports 800 pounds per acre.

Osage reports 1,000 pounds per acre, which is a large average yield unless it be on the best lands of the county.

Gasconade reports a sale of 8,000 pounds only.

Franklin is noted for the quality of its tobacco. It has often taken the premium at the St. Louis contests.

The fifth district contains ten counties, Washington, Jefferson, Ste. Genevieve, St. Francois, Iron, Reynolds, Shannon, Madison, Bollinger and Wayne, comprising an area of 3,812,495 acres on or near the Mississippi, in the eastern part of the south half of the State.

Topography.—This district lies across the eastern and most mountainous part of the Ozark highlands. In it are the world renowned Iron Mountain and Pilot Knob. The famous mines of lead, zinc, copper, cobalt, nickel and the quarries of Ozark granite and marble are in this district.

The surface is broken into small mountains, knobs, ridges and hills, separated by narrow valleys. Springs and streams of clear, sparkling waters are everywhere abundant.

Geology.—The geology of the fifth district is made up of the magnesian limestone series of the Lower Silurian. Small areas of Devonian and subcarboniferous rocks in Ste. Genevieve and Jefferon counties, the archaean strata of Pilot Knob and the igneous and metamorphic greenstones, porphyreys and granites.

Soil.—The soils of this district are very variable. The *magnesian limestone* soil is the most abundant. An analysis and description of it may be seen on page 31.

The bottom lands have light, rich alluvial soils of the very best quality, but the area accupied by this soil is small.

The pine lands are based upon soils formed by the decomposition of the sandstone in the magnesian limestone series, and are light and warm, but rather thin.

Black-Jack lands occupy the high flint ridges. Black-jack, black hickory, summer grapes and sumac are the usual growth.

These lands are too poor and rocky for ordinary cultivation, but may be utilized for timber, pastures and fruits, especially the grape.

But nearly all the soils of the district produce excellent tobacco. Though all the counties in this district have raised some of the staple and have fully proved their adaptation to it, not one of them has entered very largely into its culture.

Bollinger reports crops ranging from 800 to 1,000 pounds.

Jefferson produces good tobacco, but now plants very little.

Stoddard reports a crop of 300 hogsheads in 1877.

Oregon reports 20,000 pounds in 1876.

Iron also has soils suited to this staple, and good crops have been raised.

Madison reports a crop of 24,000 pounds.

Reynolds gives tobacco as a successful crop, though grown in small quantities.

Shannon, like Reynolds, reports tobacco as one of the successful products of her soil, 20,000 pounds in 1880.

Ste. Genevieve was an early producer of this staple. It succeeds well and might be produced on a large scale.

St. Francois produces crops ranging from 400 to 1,000 pounds per acre.

Washington raises small quantities only.

Wayne reports small quantities of tobacco among her products. The crop of 1879 was 100,000 pounds.

This district has soils and climate well suited to the production of excellent tobacco.

The sixth district of eight counties, on or near the line of Arkansas, comprises an area of 3,504,297 acres in the southern center of the State.

Topography.—This district lies along the southern declivities of the Ozark Highlands. Its general surface was an undulating plain, declining to the south, through which numerous streams have cut their valleys, often leaving the declivities abrupt and mural.

Climate.—The climate of this delightful region is as bright and warm as the Italian. The summers are long and temperate and the winters short and mild.

Geology —The formations are the same as in the Fifth District.

The Magnesian Limestone Series constitute the underlying consolidated strata of the entire district save a few small areas.

The *Quaternary* marly clays cover the highlands, and allviums are spread over the valleys.

Soils.—The *white oak* and *post oak*, *pine lands* and *black jack* occupy the highlands, the *magnesian limestone lands* the declivities and narrow valleys, and the *bottom lands* the broader valleys. These soils are described in the preceding pages; and all of them are well adapted to the production of tobacco of a superior quality, as proved in this and other districts of the State.

Barry county raises small quantities, and reports 1,000 pounds per acre.

Carter reports tobacco a successful crop.

Douglas produces good crops of tobacco; small areas only are planted.

Howell reports twenty acres and 1,000 pounds per acre.

Ozark reports tobacco as a successful crop.

Ripley gives 1,000 pounds per acre as the average yield on her soils.

Stone reports 100 acres, and an average yield of 400 pounds per acre.

Taney reports 500 acres with an average yield of 800 pounds per acre.

Cheap and convenient transportation would largely increase the production of tobacco in this district.

The Seventh District includes five counties in the southwestern center of the State, comprising an area of 2,009,342 acres.

Topography.—This beautiful region lies on the western declivities of the Ozark Highlands, and presents a gently undulating surface of

prairie and woodland. The river valleys are but little depressed below the general level of the country. Bold, perennial springs and clear streams abound and make this one of the best watered regions of the country.

Climate.—The climate is delightful, and the various census reports make it the most healthful region of the continent.

Geology.—The geology is strikingly different from any of the districts yet described.

The Subcarboniferous Limestones underlie the entire district, save a small area of coal measures in the northwest corner of Jasper, and a similar area of silurian limestones in the northeast corner of Greene. Ores of lead and zinc are found in vast quantities in these limestones.

Quaternary clays and marls cover nearly all the uplands, and sandy alluviums all the valleys.

Soils.—This district has large areas of soils of excellent quality. Some of the prairies approximate the *resin-weed lands* in their properties, and much of the upland timber is equal to the *hickory* lands of North Missouri. *White oak* and *post oak lands* abound in all the counties.

The *bottom lands* have the good qualities possessed by these lands in other parts of the State.

Black jack lands occupy some of the high flinty ridges which are too rocky for ordinary cultivation, and can be used only for pastures or fruits or timber.

Dade county reports tobacco among her staple products.

Greene county reports 127 acres, with an average yield of 1,000 pounds per acre.

Jasper reports 100 acres and good crops.

Lawrence produced good crops and shipped 200,000 pounds.

Newton reports a yield of 800 pounds per acre.

These facts show the Seventh District an excellent tobacco region, as its genial climate and warm, rich soils would indicate.

The Eighth District contains five counties in the eastern part of Southwest Missouri, comprising 2,361,970 acres.

The *Topography* is indicated by the position of the district on the Ozark Highlands. These highlands have an elevation of some 1,600 feet, and present a broad, undulating plateau, with a few ridges rising above the general plain and valleys cut below it by the streams. The acclivities to the ridges above, and the declivities to the valleys below, are often broken and mural.

Geology.—The underlying rocks are the magnesian limestone series with a few unimportant exceptions. The Quaternary clays and marls occupy the plateaus, and the alluviums the bottoms.

Soils.—The geology as usual indicates the soils, post oak, white oak, *pine and black jack lands* occupy the plateaus and ridges, the *bottom lands* the river valleys, and the *magnesian limestone lands* the declivities.

Large springs and clear streams abound in all parts of the district.

The climate is mild and healthful, and well suited to the production of tobacco.

Dallas county reports 40,000 acres in tobacco, and a good crop.

Pulaski raised 30,000 pounds one year.

Laclede places tobacco among her staple products, and 700 pounds per acre as the average crop.

Texas reports large crops of tobacco, with an average yield of 700 pounds per acre.

Webster is the leading tobacco county in the Southwest. The quality of the leaf produced stands high. The crop of 1876 was 350,000 pounds.

Wright reports the culture of small quantities of tobacco only; but enough has been raised to prove the adaptation of soil and climate to this staple. The crop of 1877 was about 100,000 pounds.

The Ninth District is composed of four counties, on or near the western boundary, and in the western center of South Missouri, comprising an area of 1,877,541 acres.

Topography.—The face of the country was gently undulating with a few mounds of small extent left by the denuding agencies that wear away the general surface. The valleys of the streams intersects the plain and produce a perfect drainage, and a good variety of upland and bottom lands.

Geology.—The geology of the Ninth District is more varied.

The Magnesian Limestone Series is developed along the Osage.

The Subcarboniferous rocks underlie half of St. Clair and about one-third of Vernon.

The Coal Measures underlie Bates and parts of St. Clair and Vernon.

The Quaternary clays and *marls* cover all the uplands, and the alluviums the river valleys.

Soils.—The district is happily interspersed with timber and prairie. There is prairie in abundance for culture and an ample supply of excellent timber for all the wants of a farming and manufacturing people.

The Bottom Lands have all their usual rich qualities. They occupy large areas in the district.

White oak and post oak Lands cover large portions of the uplands.

Lands about equivalent to the hickory soils abound. Large areas of prairie have mulatto soils of very productive and durable qualities.

The soils and climate of the district are well suited to the production of a good quality of tobacco.

Bates reports good results from the trials made with tobacco; 460 acres grown last year.

Cedar reports large crops of the very best tobacco raised on the *post oak lands*. Large quantities are produced.

St. Clair has succeeded well with tobacco, and assigns the revenue laws as a reason for the restricted culture.

Vernon raised good crops of fine quality, but little is cultivated—40,000 in 1876.

The Tenth District includes four counties on the Mississippi, in the Southeastern part of the State, and comprises an area of 1,256,000 acres.

Topography.—This district is wholly in the broad level Mississippi bottom, save a portion of Scott county.

The Geology is nearly all alluvial. A portion of Scott is underlaid with the lower Silurian limestones, which are covered with quaternary clays and marls.

The Soils are nearly all bottom lands of great richness and fertility. The highlands in Scott county approximate the hickory lands of the northern part of the State in quality and productive capacity, as the bluff marls underlie considerable areas.

The climate and soils are all that can be desired for the production of large crops of tobacco.

Scott reports one crop of 375,000 pounds of good quality.

Mississippi reports good results from the small areas cultivated in tobacco.

New Madrid has produced luxuriant crops; but little is now cultivated.

Pemiscot reports tobacco as one of her staple products.

The Eleventh District contains four counties in the northeastern corner of the State, and comprises an area of 1,119,418 acres.

Topography.—This is a rolling table land, inclining to the south and east. Numerous streams have worn their way through it to the

great valley of the Mississippi on the east. It is characterized by rolling uplands and level valleys, with abrupt and gentle declivities from the highlands to the plains below.

Geology.—Coal measures underlie the northwestern portions, and the subcarboniferous limestones the south and east. The drift and bluff marls cover the highlands, the lower terrace and alluvial are spread over the valleys.

The soils, as indicated by the geology, are productive and durable. Timber and prairie are intermingled in all the counties. Elm, hickory and *white-oak lands*, with prairies of corresponding fertility, occupy the highlands, and rich *bottom lands* cover all the river valleys. The soils, the climate and crops of tobacco raised, fully prove the adaptation of the district to the culture of this staple.

Clark reports 20 acres, with a yield of 300 pounds per acre.

Lewis places tobacco among her successful crops.

Scotland reports tobacco a profitable product.

Knox reports a crop of 20,000 lbs., 1,000 lbs. per acre.

Schuyler raises good crops and is one of the best tobacco counties in the northeastern part of the State.

In conclusion, it may be well to ask attention to the vast amount of plant food in the soils of the districts described, but more particularly to the amounts found in subsoils resting upon the bluff and formed out of the rich marls of the bluff.

To show at a glance the amount of plant food in the soil itself, and then in each foot of depth below the soil, I have prepared the following table, which presents an average of all the varieties of soils resting on the bluff, from the richest hackberry land to the poorest white-oak, and the amount for each foot in depth for the first three feet, and also for one foot at the depth of twelve feet below the surface. Other portions, between the third and twelfth foot and below, are equally rich:

TABLE Showing the amounts of the various elements of plant food in each foot of the Missouri soils resting on the bluff.

Below the Surface.	1st foot. Lbs.	2d foot. Lbs.	3d foot. Lbs.	12th foot. Lbs.
Lime	19,166	16,117	29,494	26,484
Magnesia	13,829	30,927	18,184	18,818
Potash	13,810	32,234	17,413	40,423
Soda	7,157	7,405	11,843	104,544
Phosporic acid	12,868	11,157	13,996	1,491
Organic matter	269,636	258,381	142,310	46,787
Sulphuric acid	3,180	2,990	4,051	Not known.
Chlorine	405	429	664	Not known.
Carbonic acid	Not known.	Not known.	Not known.	44,605

This table shows these soils as rich in plant food, save the organic matter (which plants obtain in large part from air and water), at a depth of three feet, as they are at the surface, even a little richer in phosphoric acid, soda, potash, chlorine, sulphuric acid, magnesia and lime.

At twelve feet below the surface the amount of plant food is still greater, except in organic matter and phosphoric acid.

Farmers usually cultivate less than one foot of their soils, and when the plant food is exhausted from that he uses fertilizers, at great expense of money and labor, to supply the plant food. But the farmer, on these Missouri soils, when the surface soil is exhausted, has an abundance of the best fertilizers in his subsoil; and instead of buying fertilizers and spreading them over the surface, he sets his plow a little deeper and turns them up from his own stores in the subsoil. And when the plants have consumed the supply thus obtained there is still lower down enough of the same costly materials to replenish his soil a hundred times; for it goes all the way down to depths, varying from 10 to 200 feet, all about equally rich, as the table shows it to be at a depth of twelve feet.

To show the money value of this store of plant food in the subsoil of all these lands, we may reckon the commercial value of the phosphoric acid for a single foot in depth on one acre. The second foot of these soils, that is, the subsoil from the depth of one foot to two

feet in every acre, contains 11,157 pounds of this acid. At ten cents a pound* this would cost $1,115.70. The next foot below, that is from two to three feet in depth, contains in each acre 13,996 pounds of phosphoric acid, which would cost $1,399.60.

Thus it is seen that two feet only of these subsoils contain on each acre as much phosphoric acid as could be bought in commercial fertilizers for $2.513.30.

The soils, as above shown, from which these results are obtained, were selected as representative soils from the lands of all grades and from all parts of North and Central Missouri.

If we should calculate the commercial value of the other fertilizers, as potash, soda, sulphuric acid, chlorine and organic matter found in the subsoils of a single acre, and if the calculation be extended to a depth of ten feet and one hundred feet, the results would be somewhat startling. Such a calculation would not fall far short of a demonstration of the often repeated assertion: "*Our Missouri soils are inexhaustible.*"

I have written letters to every county in the State for the amount and quality of tobacco raised and for the reason of the decline in the production, but have not been able to get definite information from many counties.

I will esteem it a favor if any one will give me corrections of the estimates in this article or additional facts in regard to the crops in any of the counties.

I am indebted to the clerks of the counties for many of the estimates herein given. G. C. SWALLOW.

*Phosphoric acid is valued at 12½ cents in commercial fertilizers.

OZARK HIGHLANDS.

Report on the Agricultural College Lands Lately Sold.

COLUMBIA, June 1, 1881.

To the Executive Committee of the Board of Curators:

In accordance with the following resolution I hasten to state such scientific facts as have come under my observation pertaining to the value of the Agricultural College lands:

"*Resolved*, That Prof. G. C. Swallow, former State Geologist of Missouri, be requested to make out for the Executive Committee, and by them to be laid before the Board of Curators, a full and complete statement as to the location and probable prospective value of the Agricultural College lands lying in the various counties, and wherever situated in this State."

SITUATION.

These lands are located in Missouri, on the plateau and slopes of the Ozark highlands, situated in the southern portion of the State, between the 36th and 38th degrees of north latitude.

TOPOGRAPHY.

These Ozark highlands are an undulating table land, varying in elevation from 800 to 1,500 feet above the ocean. From this table land the country descends in gentle slopes in every direction. On the northern slope are the headwaters of the Sac, Pomme de Terre, Niangua and Gasconade rivers, emptying into the Missouri; on the east the

Meramec and the Big rivers flowing into the Mississippi; on the south the waters of the St. Francis, Current, White and its tributaries descending towards the Arkansas; and Spring river and Shoal creek on the western slope.

The valleys of these numerous streams are at first but little depressed below the general level of the country, but as they descend they grow deeper and wider until they expand into broad alluvial bottoms bounded by bluffs more or less precipitous.

The surface is sufficiently undulating to be well drained, and level enough for all agricultural purposes. There are a few ridges rising above the general level of the plateau, and in a few places on the southern slope, there are escarpments of moderate height.

CLIMATE.

The climate is the most delightful of the Mississippi Valley. There are no mountains of arid plains to disturb the equable and agreeable temperature which usually prevails at this altitude under the 37th parallel of north latitude, and there are no swamp or overflowed lands from which malarious exhalations can arise to affect any considerable portion of the country.

The climate, as these facts indicate, and our meteorological observations clearly show, is most agreeable and healthful.* The summers are long and temperate, and the winters short and mild. The bright skies and pure atmosphere are well suited to secure buoyant spirits and vigorous health.

The rain-fall is a happy medium between the superabundance of some of the Gulf States to the southeast, and the marked deficiencies of the prairie States further west.

SOILS.

The soils are rich and diversified. Those of the valleys are a rich sandy loam, warm and productive, while those on the uplands are a rich clayey loam, based upon marly clays. The decomposition of these limestones on which these soils rest and their debris washed into the valleys, render all the soils limy and warm, save in small areas where sandstones prevail.

The soils on some of the ridges, and generally those on the abrupt declivities to the valleys, contain numerous fragments of chert and

*Our census reports show this one of the most healthful regions of the United States.

hornstone. These fragments are often so numerous as to render the cultivation most difficult. But such lands have a rich soil and make good forest, orchard and vineyard lands and pastures.

Few counties give so prompt and abundant returns to the labors of the cultivator, and a large portion of the college lands will yield good crops for a long series of years without fertilizers, as abundantly proved by the structure and composition of the soil, and by the experience of Missouri farmers.

WATER.

There is probably no part of the world which can boast of so large a number of bold, limpid springs, whose pure, cool waters gush forth in such abundance to beautify and refresh the land. The largest of these springs discharge from 10,000,000 to 12,000,000 cubic feet of water per diem. Their waters have a temperature of about sixty degrees, summer and winter.

The streams flowing from these springs make the best water-powers in the world, since they never get so cold as to freeze, and always furnish the same amount without floods to endanger dams and mills, and without low water to stop their motion.

The numerous streams of this famous region, with their rock beds and banks furnish a vast number of secure mill sites to run the factories of an industrious people.

In short, the pure, limpid springs and streams of this region are unrivalled in beauty and adaptation to the wants of a working population.

TIMBER.

These lands sustain an abundance of the most useful varieties of timber—many varieties of oak, hickory, walnut, ash, pine, cedar, elm, poplar, cottonwood, hackberry, locust, mulberry, maple, sycamore, birch, buckeye, box-elder, cherry, crab-apple, wild plum and chestnut, besides a profusion of beautiful shrubs and vines. While the valleys and lower slopes have a heavy growth, the upper slopes and higher ridges have a smaller growth of scattered trees, mostly oak and hickory, known as "oak openings," and the level uplands have the same oak openings, or a larger and denser growth of the above named deciduous trees. Large areas in places (where sandstones render the soil sandy) have large forests of yellow pine, which will furnish a vast amount of excellent lumber. Some of the poorer ridges produce a stunted growth of black-jack, black oak and hickory.

McDonald, Texas, Wayne, Ripley and Douglas counties have large areas of pine timber on these college lands.

The various kinds of oak, locust and walnut would furnish a vast number of the very best railroad ties and fencing.

PRAIRIES.

Small prairies are so interspersed with the timber as to render the opening of farms far less expensive and tedious than in regions wholly timber or wholly prairie.

ADVANTAGES FOR MANUFACTURES.

The numerous water-powers, the vast supply of the very best varieties of timber, the genial and healthful climate, the proximity to the main lines of railroads built and in process of construction, which penetrate the great west, southwest, south and even Mexico, and the short distance from the vast coal and iron beds and extensive manufactories of iron and steel in the State, render this the very best region for manufacturing agricultural implements, railroad cars, furniture, carriages and household furniture.

Here is an abundance of white, post, black, burr and chestnut oaks, ash, hickory, maple, elm, cottonwood, pine and linn for cars, carriages and agricultural implements; and black and white walnut, cherry, ash, maple, mulberry, locust, hackberry, box-elder, cedar, black birch and sycamore for finishing cars and houses and for their furniture.

These hard, strong, beautiful and durable kinds of wood, so expensive in other regions, constitute the principal growth in these college lands.

GAME AND FISH.

Deer, foxes, rabbits, squirrels, coons, opossums, turkeys, geese, ducks, cranes, curlews, snipe, prairie chickens, quails and pheasants abound in this whole region.

The streams contain a large variety of fish, and the numerous pure springs and streams give unusual advantages for fish culture on a large scale.

CROPS.

The leading crops now successfully cultivated in this region are wheat, rye, barley, oats, maize, Irish and sweet potatoes, turnips, sorghum, cotton, flax, peas, beans, tobacco, clover, timothy, red-top and blue grass.

Blue grass, esteemed our best pasture grass, spreads spontaneous over the grounds of hill and valley as fast as the country is settled up and grazed.

STOCK RAISING.

Southern Missouri is noted for its adaptation to stock raising. Cattle, horses, mules, sheep and swine find the pastures sufficient, save in a few months in winters exceptionally cold, and when fattening for market.

FRUIT CULTURE.

Fruits of all kinds adapted to the latitude have been most productive in this part of the State. Apples, pears, peaches, quinces, plums, cherries, grapes, strawberries, blackberries, raspberries and gooseberries all do extremely well in this "land of fruits."

The native apples, cherries, plums and grapes, show a perfect adaptation of soil and climate to these and similar fruits, and it is a remarkable fact that the soils filled with flints on the ridges and steeper declivities, and thus rendered less useful for ordinary field crops, produce the best cultivated varieties of apples, pears, peaches, cherries, plums and grapes.

MINERAL PROSPECTS.

The very probable discovery of more valuable mineral deposits in these college lands adds much to their prospective value and detracts nothing from their well-known value for farm purposes. These lands are surrounded one the east, north and west by the vast mines of iron, lead, copper, zinc, cobalt and nickel so well known in Missouri; and many of these mines are in the same counties with these lands, and in some instances of sections adjacent to them. And some promising outcroppings of iron and lead and zinc have been found on the lands themselves, as reported by those who surveyed them.

And what is still more significant these college lands lie upon the same geological formations which contain all the above named mines of the State. Nearly all of them are on the magnesian limestone series of the lower silurian system, the great mineral bearing rocks of Missouri, which contain nearly all the mines of iron, copper, cobalt and nickel, and a large part of the mines of lead and zinc. And besides nearly all the remainder of the lands rest upon the subcarboniferous limestones, which contain the very rich and extensive lead and zinc mines of Granby and Joplin in Newton and Jasper counties. And

besides those on the subcarboniferous rocks are nearly all within the mineral belt just named. The position of these lands on the well known mineral bearing rocks of Missouri, their proximity to the rich mines of the State and the various favorable indications of mineral deposits already discovered on them must certainly give them a prospective value far greater than the appraised value which was put upon them for agricultural purposes and for the timber growing on them. The timber was then but little esteemed on account of its distance from transportation. Since then the demand for timber has much increased and new railroads have traversed the counties containing the lands, giving further facilities for transportation and a greater demand for lumber of all grades. Very respectfully submitted,

G. C. SWALLOW,

State Geologist and Dean of the State Agricultural College.

SCHOOL OF AGRICULTURE

OF THE

MISSOURI UNIVERSITY,

AT

COLUMBIA, MISSOURI,

CONTAINING THE REPORTS OF

PROFS. SWALLOW, TRACY AND HUSMANN.

XI. AGRICULTURAL AND MECHANICAL COLLEGE.

FACULTY.

SAMUEL SPAHR LAWS, LL. D., PRESIDENT,
Professor of the Sciences of Mind.

GEORGE C. SWALLOW, LL. D., DEAN,
Professor of Agriculture and Natural History.

JOSEPH FICKLIN, PH. D.,
Professor of Mathematics and Astronomy.

PAUL SCHWEITZER, PH. D.,
Professor of Chemistry.

S. M. TRACY, M. S. (Michigan Ag. Col.),
Professor of Entomology and Botany and Superintendent of Gardens.

THOMAS J. LOWRY, S. M., C. E.,
Professor of Engineering.

DAVID R. MCANALLY, JR., A. M.,
Professor of English.

GEORGE HUSMANN,
Professor and Superintendent of Pomology and Forestry.

BENJAMIN F. THOMAS, PH. D.,
Professor of Physics.

WM. A. CAUTHORN, A. M.,
Assistant Professor of Mathematics.

CONRAD DIEHL,
Professor of Art.

ROBERT B. MADDEX,
Farm Superintendent.

HON. JOHN WALKER, JOHN S. CLARKSON, HON. JERRE C. CRAVENS,
Farm Committee.

The Board of Curators announced "a full course of lectures on Scientific Agriculture by Professor Swallow," in the year 1859, (Cat. 1859, pp. 26-27,) and in 1870, this Department was revived and reorganized, upon the basis of the Congressional land grant of 1862, and has, from its reopening, been in charge of Professor Swallow, who was first entrusted by the Curators with this line of work, twenty years ago.

COURSE OF STUDY.

The course of study is made strictly professional, and is reduced to *Two Years.*

The first year is essentially Horticultural, and the pupil who completes it will be entitled to *The Certificate in Horticulture.*

The second year is Agricultural, and its studies, together with those of the first year and those required for entering the Senior Year, make the full Agricultural Course, and entitles those who complete it to the Degree in Agriculture (B. Ag.).

COURSE OF STUDY.

JUNIOR YEAR—HORTICULTURE.

		HOUR.
First Semester.	Propagation, Pruning, Training, Soils, Fertilizers, Tillage and Drainage	I
	Pomology, Nursery Business,* Forestry and Meteorology	II or IV.
	Mechanics and Physics	III.
	Nursery Work at Discretion of Professors	V and VI.
Second Semester.	Gardens and Gardening, ½	II.
	Entomology, ½	IV.
	Orchards, Vineyards, Fruit Gardens, Ornamental Trees and Lanscape Gardening	III.
	Botany	I.
	Work in Gardens and Vineyards at the Discretion of Professors	V and VI.
	SENIOR YEAR—AGRICULTURE.	
First Semester.	Zoology and Veterinary Science	III and VI.
	Farm crops and Surveying	IV and VI.
	Agricultural Chemistry	I.
	Mineralogy and Mechanical Drawing	II.
	Field Work, or Feeding and Care of Stock	V and VI.
Second Semester.	Farm Buildings, Machinery, Fences and Water Supply	I.
	Domestic Animals and Farm Law, Geology, Roads and Bridges	II.
	Outdoor Work	V and VI.

*In this the pupil is fitted to engage in the profitable business of selling nursery stock by which he may, during vacation, pay his collegiate expenses if he be energetic and skillful. Any number can do this.

Requirements.

To enter the Junior Class the student must understand Arithmetic through Fractions.

To enter the Senior Class the student must pass a satisfactory examination in Arithmetic, English Grammar, Geography, first three books in Geometry, and Trigonometry of the Right-Angle Triangle, and before graduation the student must spend two months, June and July, or their equivalents, in the work of the College, for which he will be paid full price for his labor.

The June and July previous to entering the Senior Year is the best time to meet this requirement. The arrangement of the details of this matter is left to the discretion of the Dean of the College.

The daily Field exercises are designed to give the student a working knowledge of the profession, and will be required no longer on any one subject than is necessary to accomplish this end.

Course of Study.

This course of study has been adopted as comprising only what is absolutely necessary to a good Agricultural Education. Our *Means of Instruction* is tolerably full in the studies of the Junior Year. But there are some important deficiencies in the means of illustrating the studies and work of this year.

We need *Models* for showing the Structure of Plants and their Organs and Seeds.

We have no Instruments for doing the Practical Work of the Meteorologist—for showing the conditions of the Atmosphere and indicating the coming changes of the Weather. Without these no farmer is fully prepared to do his work with the greatest economy and success; and surely no Agricultural Education can be complete without a practical knowledge of their use.

There are still greater deficiencies in the means of teaching the studies and work of the Senior Year.

In Veterinary Science we have neither Teacher nor Apparatus.

In Zoology and Comparative Anatomy of the Domestic Animals we have very little. The few specimens we have, make more obvious the necessity for a hundred others. We can give no course of instruction on the Domestic Amimals, such as an Agricultural College should give, without Skeletons and Preparations or Models of their important organs. These we have not.

We have been thus far unable to procure the jars necessary to preserve and exhibit the animals we have collected.

We have no barns for the preservation of our crops, and no stables and other buildings for experimental feeding.

Nor have we the jars, cases and room for preserving and exhibiting our farm crops for yearly comparisons to show the results of our experiments.

We have made many experiments with most valuable results; but the benefits to the students and the public generally, will be in the main lost in consequence of our inability to preserve the specimens of the experimental crops.

Our instruction in the care of feeding of Domestic Animals must be imperfect until we have more varieties of improved animals and preparations for comparative feeding.

For ten years we have labored in hope, doing the very best we could with the means at our command, to give an Agricultural Education.

More than five hundred students have entered our classes, and we have been able to hold them to the course as far as we have had even small means of instruction. But when they reach the studies of the higher classes where no means of instruction have been provided, the students naturally gravitate to the Lecture rooms supplied with apparatus.

It may not be usual for schools to advertise their deficiencies, but common honesty has compelled us to do this for ten successive years.

Since the State has again failed to give us such means of instruction as other Agricultural Schools have, we must do the best we can with what we have, trusting the more to *brain and muscle* for the good we can do.

We do this the more cheerfully since we fully believe, with all our deficiencies, our course of instruction is inferior to none in practical value to all in the common walks of life, and vastly superior to all others to the Farmer and Horticulturist.

DEGREES AND CERTIFICATES.

Those who complete the Junior Year, the Horticultural Course, will be entitled to *The Certificate in Horticulture;* and those who complete the Senior Year, *The Course in Agriculture*, will be entitled to the Degree in Agriculture (B. Ag.,) Certified by a Diploma.

PRIZES.

Prizes to the Junior Class—Horticulture.

1st. The Swallow Prize for the Best Essay on Pruning.
Loudon's Encyclopedia of Gardening.

2d. For Best Specimens of Propagation including Apples, Pears and Grapes, Strawberries and Gooseberries—20 plants each, $10.

3d. For Best Show of Garden Vegetables, including Tomatoes, Cabbages, Onions, Peas and Beats—20 plants each, $10.

Prizes for Senior Class—Agriculture.

4th. For Best Corn Culture, ¼ acre, $10.

5th. For Best Reaping, Binding and Shocking, ¼ acre, $10.

6th. For Best Specimen of Plowing, ¼ acre, $10.

The College will furnish the land and materials, but all the work must be done by those contending for the prizes.

Design of this Industrial College.

It is the design of this school to fit the pupil for the most successful and honorable farm life—to give him the scientific knowledge—that will best enable him to understand his work and the manual skill which will fit him to do it with the greatest ease and accuracy.

To do this, one must have a thorough knowledge of his profession, and be able to do his work with skill and success.

The first and highest employment of man is to cultivate the soil, and feed and clothe the world. To do this well has been the ambition of the great and good of every land. The increase of populations and the multiplied demands for the products of the soil, must render this department of human industry more and more prominent, lucrative and honorable.

It is, therefore, eminently appropriate for this College, located in the midst of the best agricultural regions of the continent, in which the populations of the earth are concentrating with unprecedented rapidity, to invite our youth to such a collegiate course of study and labor as will best fit them to develop the agricultural and mechanical resources of the State, and meet the coming demand upon their capacities. For such an education, a man must learn two things:

1. What to do, and how it should be done.
2. He must acquire the manual skill to do it, and do it well.

To know what and how, is the *Science.*

To have the manual skill, is the *Art.*

To get the *Science*, he must study.

To get the *Art*, he must work.

Our Industrial College, then, must be a school of *labor* as well as of *study.* But how much study and how much labor, are questions not definitely settled, but in general terms it may be stated:

The pupil must study until he knows what should be done, why and how. When this is accomplished, the intellectual division of an industrial education is finished.

The pupil must labor until he can do all farm work with skill; and when this is accomplished, the manual division of an agricultural education is finished.

Whatever is more than this, has no more place in an agricultural school than in any other. It is not the idea of our school to furnish a place for pupils to work,* but a place where they may learn to work as well as to think.

But what shall the pupil do? Everything that is done on the farm, in the garden, orchard and nursery.

Who shall direct the labors of the pupils? He who teaches what is to be done, why it should be done, and how, is the one to see that it is done, and well done. Then the teaching and practice will agree, science and art go hand in hand. This will prevent the introduction of many useless and impracticable theories. When one teaches merely, he can advance many beautiful theories for others to practice, but when he is expected to carry out his own suggestions, he will be more cautious, take more care that his instructions will bear the test of actual experiment.

WORK ON THE FARM.

The Farm House, heretofore used as a boarding house, has received extensive repairs, and the outbuildings have been greatly improved. The Farm House is now occupied by Prof. Swallow, who, by the action of the Curators, is placed in immediate charge of all farming, horticultural and garden operations.

Fences—Much new fence has been built, and a large amount of the old repaired.

* We furnish work, as far as possible, for those who desire it as a means of support: but this is no part of the plan of instruction.

Hedges—Some new hedges have been put out, and all the old ones put in prime order. All the *Osage Orange* hedges promise well. The *Honey Locust* hedge will evidently sooner make a fence which will be a more perfect protection against man and beast. But the *Arbor Vitæ* hedge gives some promise of success, even in our hot, dry summers and clayey soils. It will do better in wet, sandy soils.

A Garden, designed to be a *Model Farm Garden*, has been cleared up, fenced and planted with small fruits—grapes, strawberries, gooseberries, currants, blackberries and raspberries—and all the most useful vegetables in sufficient quantities to supply a large family throughout the year.

EXPERIMENTS IN INDIAN CORN.

A series of experiments has been undertaken on the Agricultural College Farm with Indian corn, to determine with absolute certainty what varieties of corn are most profitable for the various uses for which they are cultivated in Missouri. Thirteen varieties were planted in 1877, fifteen in 1878, and twenty-seven in 1879, and sixteen in 1880.

The comparative results of the experiment in 1877 were published in the catalogue of 1878; of the twenty-seven varieties tested in 1879, in the catalogue of 1880, and the results of the sixteen varieties in 1880 in Mr. Maddex's report.

We have also made experiments in the culture of wheat, potatoes and oats. (For the results see Prof. Tracy's report).

We shall also make the most exhaustive experiments with the various fruits, to determine those best adapted to our climate and soils. (See Prof. Husmann's report).

THE BEST FRUITS AND SEEDS,

thus determined, will be distributed to the people of the State.

The refusal of the last Legislature to give any assistance in supplying the farm, the garden and the nursery with the necessary and ordinary buildings and implements needed in progressive work, has compelled the College to suspend its experimental and practical work, or adopt a new policy for obtaining the funds necessary for its support.

While the other States have given their agricultural colleges endowments amounting to several hundred thousand dollars, and large annual appropriations, our own State has given ours virtually no endowment and no annual appropriations; and yet our people require the same results, the same instruction and the same costly experiments

as are demanded of colleges well endowed and to which large annual appropriations are made.

To meet these demands the College is compelled to undertake a money-making work. Heretofore its nursery products have been sold to dealers at mere nominal figures; but hereafter it will undertake to supply all demands for horticultural products, and, as far as possible, seeds of the best varieties of our farm crops. The very best fruits and ornamental plants will be offered the people of the State through the most reliable agents.

STUDENTS' LABOR.

An examination of the labor accounts of the Agricultural College, shows the following results of students' labor for the year 1880:

The Horticultural Department paid $430.65 to eighteen students for labor in the gardens.

The Department of Pomology and Forestry paid $1,110.35 to thirty-eight students for labor in the nursery and vineyard, and $1,500 commissions to thirty students for selling nursery stock.

The Farm Department paid $409.50 to thirty-three students for farm labor.

It thus appears that the Agricultural College, during the year 1880, paid $3,450.50 to University students for their labor.

Many students work for other parties in and around Columbia. Some of these students are among the best workmen we have.

Quite a number of our students pay nearly all their expenses for clothing, board and books by their work; and some of these stand in the first rank in their classes.

CLASSES IN THE AGRICULTURAL COLLEGE COURSE.

Seniors	2
Juniors	2
Sophomores	6
Freshmen	38
Total	48

PLANT FOOD IN MISSOURI SOILS.

It may be well to ask attention once more to the vast amount of plant food in the soils of Missouri; but more particularly to the amounts found in the subsoils resting upon and formed out of the rich marls of the bluff.

To show at a glance the amount of plant food in the soil itself, and then in each foot of depth below the soil, I have prepared the following table which presents an average of all the varieties of soils resting on the bluff, from the richest Hackberry land to the poorest White Oak, and the amount for each foot in depth for the first three feet and also for one foot at the depth of twelve feet below the surface. Other portions between the third and twelfth foot and below are equally rich.

Table showing the amount of the various elements of plant food in each foot of the Missouri soils resting on the Bluff.

	1st. foot.	2d. foot.	3d. foot.	12th foot.
Lime	19.166 lbs.	16.117 lbs.	29 494 lbs	26.484 lbs.
Magnesia	13.329 "	30.927 "	18.184 "	18.818 "
Potash	13.310 "	32.284 "	17.413 "	40.420 "
Soda	7.157 "	7.405 "	11.848 "	104 544 "
Phosphoric acid	12.868 "	11.157 "	13.996 "	1.491 "
Organic matter	269 636 "	253.381 "	142 310 "	46.787 "
Sulphuric acid	8.180 "	2.990 "	4.051 "	not known.
Chlorine	.405 "	.429 "	.664 "	not known.
Carbonic acid	not known.	not known.	not known.	44.605 lbs.

This table shows these soils as rich in plant food, save the organic matter, at a depth of three feet as they are at the surface, even a little richer in Phosphoric Acid, Soda, Potash, Chlorine and Sulphuric Acid. At twelve feet below the surface the amount of plant food is still greater except in organic matter and Phosphoric Acid.

Farmers usually cultivate less than one foot of their soils and when the plant food is exhausted they use fertilizers at great expense of money and labor to supply the plant food. But the farmer on these Missouri soils, when the surface soil is exhausted, has an abundance of the best fertilizers in his subsoil; and instead of buying fertilizers and spreading them over the surface, he sets his plow a little deeper and turns them up from his own stores in the subsoil. And when the plants have consumed the supply thus obtained, there is still lower down, enough of the same costly materials to replenish his soil a hundred times; for it goes all the way down to depths varying from 10 to 200 feet, all about equally rich as the table shows it to be at a depth of twelve feet.

To show the money value of this store of plant food in the subsoil of all these lands, we may reckon the commercial value of the Phosphoric Acid for a single foot in depth on one acre. The second foot of these soils, that is, the subsoil from the depth of one foot to two feet, in every acre, contains 11,157 pounds of this acid. At ten cents* a pound this would cost $1,115.70. The next foot below, that is from two to three feet in depth, contains in each acre 13,996 pounds of Phosphoric Acid which would cost $1,399.60.

Thus it is seen that two feet only of these subsoils, contain on each acre as much Phosphoric Acid as could be bought in commercial fertilizers for $2,515.30.

The soils as above shown, from which these results are obtained, were selected as representative soils from the lands of all grades and from all parts of north and central Missouri.

If we should calculate the commercial value of the other fertilizers, as Potash, Soda, Sulphuric Adid, Chlorine and Organic Matter found in the subsoils of a single acre, and if the calculation be extended to a depth of ten feet or one hundred feet, the result would be somewhat startling. Such a calculation would not fall far short of a demonstration of the often repeated assertion, "Our Missouri soils are inexhaustible."

DONATIONS TO THE COLLEGE DURING 1880.

Mr. C. Peabody, a very old and valuable Bean.
Mr. B. J. Hite, his valuable *Cook Stove Heat Fender.*
C. A. Crosby & Co., Spring Tooth Harrow.
Col. Caskie, specimen of Blunt's Prolific Corn.

G. C. SWALLOW, Dean.

*Phosphoric Acid is valued at twelve and a half cents in commercial fertilizers.

REPORT OF HORTICULTURAL AND GARDEN DEPARTMENTS.

PROF. G. C. SWALLOW, *Dean Agricultural College:*

Sir: The following report of work done in this department during the years 1880–81 is respectfully submitted :

WHEAT.

In 1877 a series of field trials of a number of varieties of wheat was commenced on the farm of the Agricultural College. The land selected for the purpose was a field which had been in cultivation for many years, but had received little or no manure and no extra culture except subsoiling in 1874, and again in 1876. The soil was a clayey loam sloaping toward the south, naturally fertile and capable of producing an excellent crop.

In 1874–75–76, the land was cultivated in corn; in 1877 a crop of oats was grown, followed by wheat; the crop harvested in 1880 being the third successive crop of wheat on the same land.

In August, 1878, a portion of the land was manured with a slaughter-house refuse, which was composted with earth in 1876, and was applied at the rate of five two-horse wagon loads to the acre; the remainder of the land was manured with stable manure at the rate of twenty loads to the acre. The wheat was sown so that each variety was grown on land having each kind of manure. The slaughter-house refuse gave the largest straw, but the brightest and the plumpest grain came from the land having the stable manure.

The crop of 1880 showed a slight difference in favor of stable manure.

In July, 1879, the land was plowed about seven inches deep, and was stirred about three inches deep with a corn cultivator just before sowing. On September 28, the wheat was sown with a drill at the rate of one and one-third bushels per acre. No after cultivation was given to the crop.

The following table gives some of the results of the trials made this year, compared with those made in 1878 and 1879. No mention is made in the table of varieties which have given less than fifteen bushels to the acre as an average in these trials:

Name of Variety.	Date when harvested.			Height—feet.		
	1878.	1879.	1880.	1878	1879	1880
Amber	June 21	June 18	June 15	3½	3¾	3¼
Amber Straw	....	....	" 12	....	....	3½
Arnold's Hybrid	June 19	June 16	" 14	4	4	3½
Arnold's Victor	....	....	" 18	....	....	3
Bull	....	....	" 1	....	....	2½
Clawson	June 21	June 19	" 21	4½	4½	3¾
Deihl	" 21	" 12	" 12	3	3½	3¼
Dott	" 19	" 16	" 12	3½	4	3½
Egyptian	....	" 20	" 14	....	3½	3½
Fultz	June 17	" 12	" 12	4	3½	2¾
German Amber	....	....	" 14	....	....	3¼
Gold Medal	June 24	June 19	" 17	4	3½	3½
Jenning's White	" 19	" 16	" 15	3	3½	3¼
Kentucky	" 11	" 18	" 19	4	4	3½
Louisiana	" 21	" 18	" 16	3	3½	3½
Mediterranean, Bearded	" 17	" 18	" 12	4	3¾	3¾
Mediterranean, Smooth	....	" 12	" 12	....	4	3½
Michigan Wick	June 21	" 18	" 16	3	3¾	3¾
Mold's Red	....	" 24	" 22	....	3	3
Mold's White	....	" 24	" 22	....	3	3½
Muskingum	June 19	" 18	" 14	3½	3¾	3½
Nursery	" 25	" 20	" 21	3½	3	3¼
Odessa	....	....	" 14	....	....	2¾
Oregon Club	June 21	June 18	" 16	4	3	3
Post	" 25	" 18	" 19	3½	2¾	3
Red Chaff	....	....	" 17	....	....	2½
Red Lancaster	June 18	June 18	" 14	4	3¾	3½
Red May	" 8	" 9	" 5	3¾	3¼	3½
Red Russian	" 19	" 18	" 14	3	3½	3
Sandomirka	....	" 24	" 22	....	3¼	3½
Sanford	June 24	" 19	" 14	4	3¼	3½
Shumaker	" 17	" 16	" 12	4½	3¾	3½
Silver Chaff	" 25	" 19	" 19	4½	4	3¼
Tappahannock	" 10	" 16	" 9	3½	3½	2¾
Touzelle	" 25	" 24	" 22	4½	3	3½
Treadwell	" 21	" 20	" 22	3½	3½	3¼
Turkey	....	....	" 17	....	....	3¼
Velvet Chaff	....	....	" 12	....	....	3½
Washinton Glass	....	....	" 18	....	....	3¼
White May	....	....	" 12	....	....	3½
White Rogers	June 19	June 18	" 14	4	3½	3½
Zimmerman	" 15	" 19	" 15	3½	4	3¼
Russian, No. 1	" 29	" 21	" 22	3½	3½	3½
" No. 2	" 9	" 18	" 9	3½	3½	3¼
" No. 3	" 29	" 24	" 23	3	3½	3½
" No. 4	" 25	" 20	" 22	4½	3½	3
" No. 5	" 29	" 24	" 24	3½	3	3½
" No. 8	July 3	" 23	" 24	4½	3½	3½
" No. 9	June 29	" 21	" 24	4½	3½	3¼
" No. 10	" 29	" 21	" 24	4½	3¼	3¼
" No. 11	July 3	" 24	" 24	3½	3½	3½
" No. 12	" 3	" 24	" 24	3½	3½	3¼
" No. 13	" 3	" 21	" 22	3½	3	3½
" No. 14	....	....	" 16	....	....	3½
A	....	....	" 14	....	....	3½
B	....	....	" 14	....	....	3½
C	....	....	" 18	....	....	3½
D	....	....	" 19	....	....	3½
Average	....	....	....	....	....	....

Weight per bu. pounds.			Bushels of grain per acre.			Weight of straw per acre.			Weight of straw per bu. of grain.			Smooth or bearded.	Color of grain.			Size of grain.		
1878	1879	1880	1878.	1879.	1880.	1878	1879	1880	1878	1879	1880.		1878	1879	1880	'78	'79	'80
55	62½	63½	20.16	31.03	36.48	2576	3240	3168	122.8	104.4	86.9	S	A	R	R	s	m	m
.....	.....	61	.....	.....	27 56	.....	.....	3266	.....	.....	118.5	B	.....	.....	A	...	..	l
59	61	60½	33 28	36.56	43 87	4592	3820	4255	140.7	104 4	97.0	S	W	A	R	l	l	l
.....	.....	59	.....	.....	28 11	.....	.....	3610	.....	.....	128.4	S	.....	.....	W	...	...	s
.....	.....	64	.....	.....	18.08	.....	.....	1775	.....	.....	98.2	S	.....	.....	R	...	...	m
58	60	59½	28 07	39.42	44 01	2646	3832	4255	96 4	97 2	95 4	S	W	W	W	l	l	l
55½	61	60	14.42	39.60	37 54	2096	3897	3849	145.3	98.4	102.6	S	W	R	R	s	m	m
59	62	63	31.04	36 40	39.27	3904	3778	3986	25.8	103 8	101.5	B	R	R	R	l	l	l
.....	60	61	.....	32.19	38.34	.....	3082	3154	.....	94.2	82.3	B	.....	R	R	...	m	m
59	63½	63	15 28	35.90	42 87	1728	2776	3708	113.5	87.0	86 5	S	R	R	R	m	m	m
.....	.....	63	.....	.....	86.97	.....	.....	3240	.....	.....	87.7	S	.....	.....	R	...	...	m
57½	60½	61½	17.39	34.68	37.67	1866	3413	3865	108.5	98.4	102.6	S	W	W	A	l	m	m
59	60½	62½	24.96	35.90	42.02	2848	3576	3890	114.1	99 6	92.6	B	W	W	W	m	l	l
58½	61½	62	25 76	29.04	36.67	3920	2840	3825	152.2	97.8	104.4	S	W	A	A	l	m	l
55	58	61½	19.49	31.18	36 42	2952	2881	3469	151.5	92.4	95.0	S	W	W	W	s	m	m
31	60½	61	21.92	28 60	31 27	3194	3812	3790	145.6	115.8	121 2	B	R	R	R	l	l	l
.....	63	62	.....	29.42	37 80	.....	4818	4575	.....	146.6	121.0	S	.....	R	R	...	m	l
57½	61	62	28.32	34.71	35.31	3245	3665	3540	114.6	105.6	100.3	B	W	W	W	l	l	l
....	56	58	.....	12 58	8.40	.....	1080	791	.....	85 8	94 2	S	.....	R	R	...	s	s
....	59	61	.....	23.85	5.12	.....	2562	530	.....	107.0	103 5	S	.....	A	A	...	s	s
58½	64	62½	21 92	32 78	33 54	3088	3496	3385	140 9	106 8	100.9	S	A	R	R	m	m	m
62½	60½	62½	13.30	38.62	29 19	2248	3765	3648	162 0	97.5	124.7	S	W	A	A	s	s	m
...	.....	61½	.....	.....	43 85	....	.....	4065	....	.....	92 9	S	.....	.....	R	...	...	m
56	58½	61½	28.80	31 88	32.22	3600	2768	2815	125.0	82.2	87.3	S	W	W	A	s	m	s
62	59	61	19.49	34 40	35.34	2952	1236	1645	151.5	36.3	46.5	B	W	A	A	l	l	l
...	.....	61½	.. ....	.....	36 08	.....	.....	3963	.....	.....	109 8	S	.....	.. ..	R	...	...	m
60	60½	62	24.65	29.78	32.66	3552	3484	3520	144 0	117.0	107 7	B	R	R	R	l	l	l
59	62	63	27 52	32 46	27.84	3024	3350	3180	110.5	103.2	114.2	S	R	R	R	s	s	s
60½	58½	60½	24.00	25.70	32.45	4016	3454	3877	167 3	134 4	119 2	S	R	R	R	l	l	l
...	58½	59½	.....	35.20	33 00	.....	3326	3240	... ...	94.5	98.2	B	.....	A	A	...	s	m
61½	61	61½	18.82	33.81	33.56	1952	3631	3485	103 7	107.4	103.8	B	W	W	W	l	m	m
60	60	62	30 56	37.20	31.67	4628	3782	3520	157.3	99.0	111.1	S	A	R	R	l	l	l
60½	60½	61½	17 82	38.47	40.77	1858	3459	3585	104.3	89.4	88.0	S	W	W	W	l	l	l
60½	62	61½	20 32	30.67	31.68	2064	2576	2495	100.2	84.0	78.7	S	W	W	W	m	m	m
61½	56	58	15.68	17.90	17 32	1952	1826	1790	124.5	102.0	100.0	S	R	R	A	l	l	l
57½	61	61½	19.52	52.38	42 09	3227	4620	4155	165.3	88.2	98.7	S	W	W	W	l	l	l
...	.....	62	.....	.....	41.40	.....	.....	4625	.....	.....	111.7	B	.....	.....	A	...	...	m
...	.....	61	.....	.....	39 36	.....	.....	3670	.....	.....	93 3	B	.....	.....	R	...	...	l
...	.....	62½	.....	.....	37.75	.....	.....	3415	.....	.....	95.5	S	.....	.....	W	...	...	l
...	.....	62	.....	.....	37 36	.....	.....	3895	.....	.....	104.2	S	.....	.....	W	...	...	m
59	60	62½	38.72	38.78	35.74	4304	3420	3015	111 2	77 2	84.4	B	W	W	W	l	m	m
60½	62	62	16.32	32.05	32 86	2224	3692	3420	136.3	115.2	104.1	S	R	R	R	s	m	m
56½	61½	61	14.21	29 15	36.67	2608	3475	3590	185.5	119.2	97.4	S	A	W	A	m	m	s
60	61½	64	23.36	27 36	30.48	2558	2462	2380	100 5	90 0	78.8	S	W	W	W	l	m	m
61½	51½	57½	8 30	35.66	31.79	1872	3509	2880	212.7	98.4	90.6	S	R	R	R	l	m	m
57	60	59½	26.40	25.50	19.95	2992	2922	2414	193 3	114.6	121 0	S	R	R	R	l	s	m
58	57½	55	21.12	29.81	24 48	4320	4900	3860	204 6	164.4	157.7	S	R	R	R	s	s	s
58	59	58½	31.52	32 22	37.65	3952	3673	3940	125.4	114 0	104.6	S	W	W	A	l	m	m
57½	60	61½	24.48	32.44	38 55	4912	2219	2820	200.6	68.4	73.2	B	R	R	R	l	m	m
57½	60	60	17.44	32.07	39 82	4000	3464	3985	229 4	108.0	100 0	B	R	R	R	m	m	m
44½	57½	60	7.38	29 91	30 05	2048	3230	3115	277.5	108.0	103 6	S	R	R	R	s	s	m
2	56	56	9 41	37.48	32 57	1728	3261	2765	183.6	87.0	84 6	S	R	R	R	s	s	m
56½	55½	58	16.80	32.56	26 60	2944	3664	2780	174.0	111.0	104.6	S	A	A	A	m	s	m
.....	.....	61	.....	.....	44.16	.....	.....	4680	.....	.....	106.0	B	.....	.....	R	...	...	l
.....	.....	61½	.....	.....	36 69	.....	.....	3105	.....	.....	84 6	S	.....	.....	R	...	...	m
...	.....	63	.....	.....	28.60	.....	.....	3115	.....	.....	108.7	S	.....	.....	A	...	...	m
.....	.....	59	.....	.....	41.26	.....	... ..	4590	.....	.....	111.2	S	.....	.....	W	...	...	l
.....	.....	61½	.....	.....	26.25	.....	.....	3150	.....	.....	120.0	S	.....	.....	A	...	...	l
57½	60	60½	21.93	32.59	33.63	3107	3270	3844	145.6	101.2	100.0	.....	.....	.....	.....	....	....	....

In making up the average for 1878, Fultz, Gold Medal and Silver Chaff are omitted, the yield that year having been lessened by accidental causes.

EXPLANATION.—A., Amber; R., Red; W., White; B., Bearded; S., Smooth; s., small; m., medium; l., large.

Many of the varieties mentioned in the table are known by other names in different parts of the State, and below are given a few synonyms: Red Lancaster, known as Lancaster, Mediterranean and Red Sea; Bull, known as Early Michigan, English Bull and Missouri Swamp; Red May, known as Early May, Gold Drop, Tennessee May, Orange, Red May, Yellow Lammas; Zimmerman, known as Democrat, Alabama May, Graham, Walker, Wilson, Late May, Lime, Golden Chaff, Lincoln and New York Premium; Clawson, known as Genessee, White Michigan and Seneca; Mediterranean, smooth, known as Sea Island; Tappahannock, known as Boughton and Golden Amber; Odessa, known as Grass; Mediterranean, known as Swamp, blue Stem and Lancaster.

This list might be extended much further, and in many cases the same name is applied to entirely distinct varieties. It is probable that the actual number of distinct varieties existing is much smaller than is generally supposed. Each year we receive from various parts of the country, samples of varieties which are supposed to be different from any we have, but which, upon trial, prove to be identical with some of those already tested.

Other varieties, which at first appear to be different, in the course of two or three years become so much like others that it is impossible to distinguish them from each other, if, indeed, there is any difference. This change of character is most noticeable in varieties which have been sent here from a distance, and which have been grown for years in a soil and climate entirely different from our own. The general tendency of most varieties, when grown here, is to become darker in color. A reference to the above table will show that while we had a large proportion of white varieties in 1878, now we have very few, most of them having changed to amber, while many of the amber colored sorts have become red, and, in a few cases, varieties that were originally white have become red.

From the table it will be seen that in 1878 the time of ripening extended from June 8 to July 3, while in 1879 it was several days shorter, beginning June 9, and ending June 24, maturity having been hastened by drouth during the growing season.

In 1880, although the harvest began more than a week ealier, it was not completed until the 24th, the same date as the previous year.

The average yield of the varieties ripening each day is as follows:

Date.	1878.	1879.	1880
June 1	.....	.....	18.08
5	.....	.....	27 84
8	27.52	.....	.....
9	23.36	32.46	31.08
10	20.32	.....	.....
11	25 76	.....	.....
12	.....	34.97	36.07
14	.....	.....	36.03
15	16.32	.....	37.12
16	.....	36.36	38.45
17	22.57	.....	38.38
18	24.65	31.54	35.04
19	28.98	35.69	34.26
20	.....	37.17	.....
21	22.68	31.56	28.67
22	.....	.....	25.91
23	.....	32.22	31.79
24	18.06	27.80	33.85
25	18 54	.....	.....
29	17.11	.....	.....
July 3	16.28	.....	.....

By this it is seen that from the beginning of harvest to June 21, in 1878, and to June 20, in 1879, there is but little difference in the yield, but that after those dates, especially in 1878, the yield decreases. The actual decrease was greater than is indicated by the table, as eighteen varieties, which yielded less than fifteen bushels to the acre, and are not included in the table, all ripened June 29, or later, in 1878, and June 21, or later, in 1879.

In 1880, with the exception of the two early varieties, Bull and Red May, there was very little difference between the early and late ripening sorts; one cause of this variation was doubtless that in previous years late ripening sorts were badly affected with rust, while this year they suffered no more than did the earlier sorts.

It will be noticed, also, that nearly all of the late varieties are of Russian origin, and the fact of their having become somewhat acclimated has enabled them to develop better than they have done heretofore.

In 1878 these Russian varieties averaged only 18.22 bushels per acre, while in 1879 they averaged 31.29, and in 1880 had increased to 32.73. No. 14, which has not been included in former reports, was obtained from a few scattering heads noticed in 1878. Although they exhibit a marked improvement over former years, the Russian sorts still have too much straw and are too late in ripening to make them desirable for general cultivation.

The average yield of the sixty varieties was larger this year than ever before, although it was the third successive crop of wheat grown on the land, the thorough cultivation every year, the manuring in 1878 and the favorable season more than making up for the exhaustion of the wheat elements in the soil.

The question: "What variety of wheat do you find to be the best?" is asked almost daily, and is one which it is extremely difficult to answer, owing to the infinite variety of soils and locations, and above all to the differences among buyers of wheat. The Clawson furnishes a very marked illustration of this difficulty. For years millers have been strongly prejudiced against it and would seldom buy it without discount of from five to ten cents per bushel. At the National Millers' Association, held in Cincinnati last year, few millers could be found who had any personal acquaintance with the Clawson, and the few who had were about equally divided on its merits. In a very thorough canvass of the St. Louis Board of Trade, made in the fall of 1880, not a single grain dealer could be found who knew any difference between Clawson and any other white wheat, and there were very few who had ever heard of any such variety. Similar inquiries were made at the Cincinnati Board of Trade with like results. Several English millers, who were shown samples of the Clawson wheat pronounced it a very valuable variety for mixing with the harder Russian wheat and preferred it to Mediterranean, which ranks highest with most American millers. The Fultz has suffered from the millers in the same way that the Clawson has, but with far less reason. In several instances, in this and adjoining counties, millers have discounted Fultz ten cents per bushel, but when offered the same wheat under another name, have taken it at the market rate, and after grinding a portion of it have been anxious to engage the whole crop, "it made so much better flour than the Fultz." Silver Chaff is not extensively grown, but is rapidly coming into favor. The grain is somewhat harder than that of the Clawson.

Champlain and Defiance are two varieties which have been extensively advertised and which have proved very valuable in spring wheats. In 1879 several parties reported equally good results from sowing them as fall wheats, but with us they were almost entirely winter-killed. The few plants which survived gave very fine results, and they will receive a further trial.

Several of the varieties which have succeeded best on the trial grounds have been sown on the farm, and with these Mr. Maddex, the farm superintendent, reports the following results: "In 1879, Clawson, two fields—yield 23 and 26½ bushels per acre. Silver Chaff, 20 bushels. Fultz, two fields, 16 and 25 bushels. These crops were all raised on dry white oak ridges, which have been in cultivation for many years, and have received almost no manure. On one field where Zimmerman was almost a failure in 1878 Sanford and Smooth Mediterranean were grown and yielded fifteen bushels per acre. Mold's White and Mold's Red gave only eleven bushels, and Sandomirka fifteen bushels to the acre."

In 1880 the yields were as follows:

Arnold's Hybrid	25⅛
Clawson	25⅜
Deihl	29⅛
Dott	20⅛
Egyptian	18⅜
Fultz	24
Post	16½
Shumaker	25
Silver Chaff	33 7/16
White Rogers	23⅛
Russian No. 2	24⅛

A little work has been accomplished toward securing improved varieties by a careful selection of seed. Seed from a stool containing eighty-four heads was saved; also from a few heads of extraordinary length. One head, containing six grains in a mesh, several heads having uniformly four grains in a mesh, and other unusually fruitful specimens have been sown by themselves, and from the crops raised from these still other selections will be made for future trials.

POTATOES.

The trials of potatoes commenced in 1878 were continued, but nearly all of the older and better known varieties were discarded and the work was confined almost exclusively to the production and testing of new varieties which have been grown from the seed, either on the college grounds or elsewhere in Missouri. The results so far obtained are very encouraging, but at least three years are required for the development of a new variety, and a still longer time to determine its real value. No full report can be made at present.

GREENHOUSE.

The greenhouse which had just been completed at the date of my last report, has proved an invaluable addition to the resources of this department, furnishing, as it does, excellent means for illustration in the class-room, besides giving work to quite a number of students, and assisting greatly in the carrying on of garden and experimental work. The greenhouse now contains a large number of plants of economic and commercial importance, and the number of these might be very largely increased if we were able to furnish space for them, but the house is now crowded to its utmost capacity, and many plants are now suffering for want of more room.

CLASS-ROOM WORK.

Class-room work has been as follows:

Studies.	Number
Students in Geography	83
Students in Botany—Structural	120
Students in Botany—Economic	31
Students in Entomology	26
Students in Horticulture	11
Total	271
Number twice counted	65
Total number of individuals	206

S. M. TRACY,
Prof. of Horticulture and Botany, and Supt. of Garden.

Report of Department of Pomology and Forestry.

PROF. G. C. SWALLOW, *Dean of Agricultural College:*

DEAR SIR:—I herewith submit report of work done in my department from April, 1880, to April, 1881.

Nursery.—This was considerably enlarged during the last year, to be able to meet the growing demand for trees by the public. The fact that there is no *general* nursery in the State, where the public, and especially dealers, can be supplied with reliable stock, would seem to make such a nursery an urgent necessity, to supply the planting public with home grown trees, as far as our climatic influences will justify, especially with evergreens, which it is almost impossible to obtain from a distance of any size, and at a suitable time for planting here. It is almost sure death to these to transplant them in the fall, and in the spring they cannot be obtained from the north in time to transplant, nor are they so well adapted to withstand our severe drouths and scorching winds. I have therefore tried to obtain young stock, and grow them here to transplanting size, an operation which the extreme drouth of the last two years and want of means for irrigation have made very difficult. To get a nursery fairly under way, is always a tedious and expensive undertaking, and although I worked with a view to the strictest economy, the expenses were necessarily larger than the income. But the inventory taken at the end of the year, shows stock on hand, at lowest wholesale rates, to the amount of about $6,000, as an offset to a deficit of $2,900, and although too early now, in the midst of sales, to draw a balance, I may safely say that the deficit will be considerably decreased, even with the large additions of young stock which have been made. A recent importation from France has shown me a very cheap source from which to draw supplies, and as the young stock purchased is much better than that obtained at twice the price in this country, I shall depend for most of my supplies of young stock on that trade. The sales in this branch of my department were very lively last fall, but the early and sudden cold snap in November interfered with many deliveries, and the imperfect manner of transportation by the railroads are a source of heavy loss every year; while the severe and long winter has had a discouraging effect upon our planters, consequently the sales are rather light this spring. But this is only a

temporary disappointment, and will be made up, I feel confident, by increased business next fall. We have handled and sold, during last fall and this spring, about eighteen thousand apples, eight thousand peaches, two thousand pears, cherries, plums, apricots and quinces, ten thousand grape vines, and a corresponding number of small fruits, ornamental stock, etc., besides the permanent plantations on the farm and in the horticultural grounds. During the winter, about 70,000 grafts of apples, pears and quinces have been made, and will be planted this spring, some 60,000 cuttings of grape vines, and ten thousand cuttings of ornamental trees and shrubs; we have grown a variety of seedlings, especially honey locust, for hedges, and ten acres will be added to the nursery plantations. This has furnished our students with labor during all the time they could spare from their studies, and is thus aiding them in the best manner by giving them instructive employment at remunerative wages. But we need more facilities; the department very much needs a fruit house, comfortable packing shed, and a house for the superintendent, so that all the labor can be performed under his immediate supervision; it also needs means of irrigation, cellars for taking care of stock, etc. The services of Mr. John C. Teas, an experienced nurseryman, have been secured at very low rates, and this has added to the reputation and facilities of the department. We are now fairly under way, and shall need but little help in the future. But a great deal, in fact *all*, depends on that help being given at the right time, and in the right place.

Vineyard.—The vineyard was properly cultivated, and yielded a good crop of grapes, but owing to the abundant crop of fruits of all kinds, these did not sell so readily, nor at such remunerative prices. About $200 were realized from the sale of grapes. The new vineyard has been trellised, and all the usual operations performed, and the addition of many new varieties will make it a source of increased instuction and profit.

Orchard and Fruit Garden.—About one hundred dollars were realized from the sale of small fruits and $100 from sale of orchard products. This could have been very much increased, as the orchard produced a very fine crop of apples, but as we have no fruit house, and no facilities for keeping them, a great portion of the apples were lost during the extreme winter. This again demonstrates the fact that we must have the facilities to do good and efficient work.

Hedges.—The hedges on the place were properly pruned, and new additions made. A piece of buckthorn hedge was planted as an experiment, to which will be added an experiment with the Pyracantha,

and as about 50,000 honey locust were grown from seed, we shall also extend our plantations of this valuable hedge plant.

Forestry.—The different species of Catalpa were planted on a piece of waste land, to which will be added other forest trees. They made a satisfactory growth, and I am satisfied that the most durable fence posts can be grown from the Catalpa Spinosa in from five to seven years, and in a shorter time from the new Catapla of Mr. John C. Teas, a fact which will be of great benefit to the farmers of the State, and which cannot be impressed upon them with too much force or persistency. Experience shows that every prairie farmer can grow his own timber in a very short time and at a very trifling cost; an interest which is lamentably neglected, and if it was fostered more, it would add millions of dollars to the wealth of the State. If we consider the fact alone, that our railroads are now paying 35 cents for good oak cross-ties, and that 1,200 ties can be grown on an acre of ground in ten years, for which they would gladly pay 50 cents per tie, on account of the imperishable nature of the Catapla wood, it would seem strange that our farmers can not be awakened to the vast importance of the subject. The cost is trifling. Yearling plants can be bought at $6.00 per 1,000; it will take 2,400, 4x4, to plant an acre, which will not take more cultivation and care in planting than an acre of corn, and this only for two years. The thinnings, after four years, will give them 1,200 good rails or stakes, worth, at the lowest estimate, as much as will pay for planting and cultivating, and at the end of ten years they can cut 1,200 railroad ties, worth $600, while the tops and trimmings will pay all their labor, and give them an abundance of the best fencing material. Can they not see that there is more money in this than in planting corn and sowing wheat?

Exhibitors of Horticultural Products.—I have considered it my special duty to attend to and work for the exhibitions of the fruits of the State, and to awaken an interest for them, as one of the best advertising mediums of the resources of our State. I spent nearly the entire vacation last summer, as far as my time could be spared from actual work and superintendence in my department, to induce our Horticulturists to make a creditable exhibition at the great fruit show of the Mississippi Valley Horticultural Society at St. Louis, which resulted in gaining the sweepstake premiums for the fruits of the State, and showing Missouri to occupy the front rank as a fruit producing State; and this fact, together with former exhibitions in which our State has taken a prominent part, alone enabled us to obtain from our Legislature an appropriation of $2,500 for two years for the State Horticultural Society, which will furnish the means to still further represent the

horticultural interests of the State at the meeting of the Am. Pom. Society at Boston this fall, and other occasions of similar interest.

In the classes of Pomology and Forestry, instructed by me during the winter, thirty students received theoretical and practical instruction in the lecture room, the work shop, orchard, vineyard and fruit garden, and the work obtained there during spare hours and Mondays, has been a material as well as a practical help to the young men who come here without means, but an earnest desire to obtain knowledge, and the will to work, which will make them useful citizens of our commonwealth. Many of them intend to canvass during the summer vacation for the sale of nursery stock, and I hope that we may thus find a means to counteract the operations of the itinerant tree peddlers, and of gradually instilling better knowledge among the people of the State.

Among the donations of seeds and plants, grafts, etc., received during the year, I will name the Department of Agriculture at Washington, D. C., seeds and cuttings; Jacob Rommel, Morrison, Mo., valuable grafts and grape seedlings; R. F. Hynes, West Plains, Mo., buds of new peaches; G. C. Eggling, Superintendent Public Parks, St. Louis, valuable seeds; Geo. W. Campbell, Delaware, Ohio, grape scions; J. W. Prentiss, Pultney, Stuben Co., N. Y., scions of new grapes; C. Kemper, Hermann, Mo., scions of apples; Ellwanger & Barry, Rochester, N. Y., valuable new trees; George Husmann, vines and scions; Nicholas Grein, Hermann, Mo., cuttings of new grapes; N. Bensing, Hermann, Mo., scions of apples; Cleveland Wine Co., Cleveland, N. C., scions of grapes; Hon. Chas A. Witmore, San Francisco, Cal., grape seeds; and many others.

I think I may safely say that the Department has made satisfactory progress during the last year, although it cannot be expected to obtain its best results until more facilities are furnished. When the Superintendent of the Department has not even a house on the grounds to enable him to keep the work under his eye constantly, when he has no fruit room to store away the products of the orchard, no cellar to store young stock, not even a good packing house to shield the men and himself from the inclemencies of the weather, no means of irrigation to refresh the perishing plants, it becomes a task of no ordinary difficulty to even keep up courage and persevere, while it is an impossibility to do the best of work. Yet I live and labor on, in hopes that a future day may bring a more liberal spirit to our Legislature, and we do the best we can under the circumstances, confident that we are doing *some* good, if not *all* we would desire to do.

Respectfully submitted,

GEORGE HUSMANN,

Superintendent Department of Pomology and Forestry.

Farm Department--Report 1880-81.

PROF. G. C. SWALLOW, *Dean:*

Our crops for the last year were about 800 bushels of wheat, a good part of which were distributed for seed, and the remainder sold at from 75 to 90 cents per bushel. 1,600 bushels of corn, of which 400 bushels were sold for seed, including 350 of the Evans variety to the Commissioner of Agriculture at Washington. The remainder was consumed by our stock. 18 tons of hay, 250 bushels of oats, 4 acres of artichokes, which were dug by the hogs.

We have sold 30 hogs and 20 head of cattle.

Our growing crops are 50 acres of wheat, looking well, including 10 varieties, 10 acres of oats, 60 acres of corn, 4 acres of artichokes, 20 acres of timothy meadow and 30 acres of clover.

We have made 100 panels of plank fence and repaired a quantity of rail fence.

Our stock consists of 9 full blooded Short-Horned cattle, including 3 young bulls (which are for sale), 45 grade cattle, 1 year old and upwards, 1 full blooded Alderney bull, and 5 grade cows and heifers, 35 stock hogs and 50 sheep.

Our experiment with corn consisted of 16 varieties. The Evans still proves the best which can be seen by the following comparative table:

CORN TRIAL FOR 1890.

NAMES.	Weight of crop	Color of corn	Color of cob	Color of pith	Length of ear	Circumference of ear	Circumference of cob	How filled out	No. of rows in ear	No. of kernels in row	Length of kernel	Width of kernel	Thickness of kernel	Weight of cob	Weight of corn on ear
Baden	285	W	W	W	9.0	6 2	3.6	Well	12	53	.50	.48	.16	1.643	9.661
Burpees Mammoth	200	W	W	W	9.3	7.2	4 6	Very well	14	53	.54	.41	.16	2.841	10.896
Chester County Mammoth	272	Y	R or W	C W	9.4	6.5	4 2	Well	16	50	.56	.37	.18	2.368	9 665
Evans	301	Y or Y R	R or W	B W	9.4	6.8	3.7	Well	16	60	.60	.37	.16	1 781	10.901
Gold Dust	198	Y	R or W	C W	9.0	7.0	4.4	Well	16	50	.50	.35	15	2.267	9 488
Golden Dent	277	Y	R or W	C W	9 8	5.5	3.5	Well	12	55	.47	.38	.16	1 287	7.022
Golden Yellow	275	Y	R	C W	9.5	6.4	3.7	Very well	14	60	.58	.36	.17	1.560	9 584
Illinois Yellow	288	R Y	R	C W	8 6	6.5	3.5	Well	14	53	.54	.36	.20	1.649	8.841
Long John	280	W	R	C W	10.0	5.7	3.5	Well	12	44	.58	.44	.20	1.691	9.052
Pale Yellow	238	Y	R	C W	9.5	6.8	4.5	Well	16	52	.55	.41	.19	1.975	10 581
Proctor Bread	281	W	W	B W	8 0	7.6	4.4	Well	20	45	.57	.37	.17	1.868	10.608
Ragans White	204	W	W	C W	8.5	6.8	4 1	Well	16	55	.55	.38	.16	1.690	8 542
Ragans Yellow	248	Y	R	B W	8.6	7.2	4.3	Well	18	54	.57	.36	.18	1.949	10.842
St. Charles White	260	W	R	C W	8.5	6 7	4.0	Well	18	50	.52	.35	.16	1.554	8.341
Thompson	269	W	W	C W	8.0	6.7	3.6	Well	14	52	.64	.37	.18	1.560	9.224
Snow Flake	220	W	W	C W	10.0	6.8	4.6	Poor	16	48	.48	.33	.19	2.771	9.468

R. B. MADDEX, Farm Superintendent.

IMPLEMENTS RECOMMENDED.

HITE'S COOK STOVE HEAT FENDER.

Having tried this Heat Fender one season, it becomes my wish that all may enjoy its advantages.

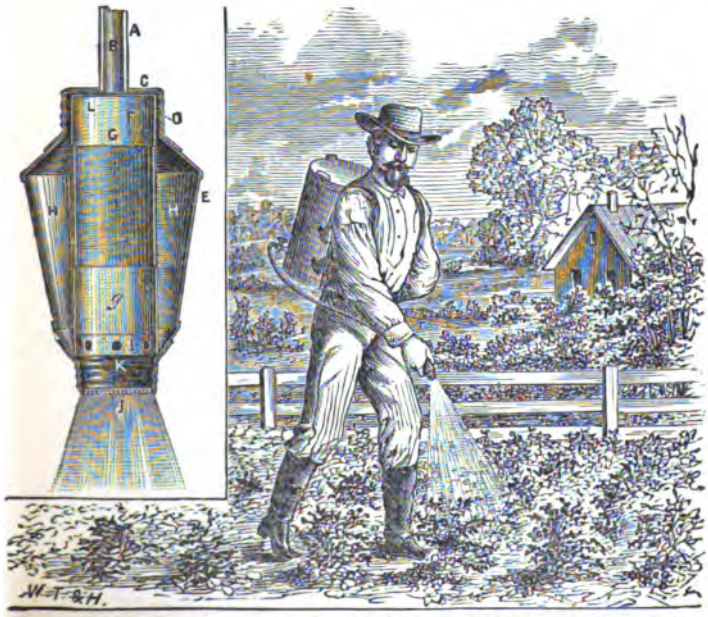
The cook room is kept as cool as it would be without any stove and fire; the odors of cooking food do not enter the room and rest of the house; the cook is protected from nearly all the heat of the stove; and its upper portion is an excellent place for drying fruit and vegetables.

These Fenders are manufactured at Mexico, Mo., by B. J. Hite.

BEST BUG EXTERMINATOR.

S. H. Fox of St. Louis, manufactures the best apparatus we have used for the destruction of the Insect Pests of garden and farm.

We have used it two seasons and find it convenient and effectual and economical for the application of poison solutions.



G. C. SWALLOW, Dean Ag. College.

STATISTICS

F THE PRODUCTION OF WHEAT IN THE UNITED STATES, WITH TABLES OF ITS VALUE, YIELD PER ACRE, CONSUMPTION, MANUFACTURE AND EXPORT, AND SUCH OTHER MATTERS AS ARE RELATED TO IT.

)MPILED FROM OFFICIAL DOCUMENTS AND INFORMATION OBTAINED DIRECTLY FROM HEADS OF DEPARTMENTS,

BY

P. SCHWEITZER, PH. D.,
Missouri State University, Columbia, Mo.,

1881.

PREFACE.

The following tables grew out of annual courses of lectures on agricultural and domestic chemistry, and were intended to supply the student with information by facts and figures that would enable him to form an intelligent judgment of the economic, industrial and professional questions touched upon in the lectures; they have been revised with much care and patience, and are published in the hope that they may render a like service to teachers and public economists, and help to induce State legislatures, notably our own, to make provision for the systematic collection and publication of agricultural and industrial statistics which, by their practical utility, will enhance the credit and material prosperity of the State more than all the fulsome praises and long-winded discussions of county and State societies taken together.

The main sources of information in the compilation of the following tables were:

1. The Reports of the Department of Agriculture.
2. The Reports of the Chief of the Bureau of Statistics on Commerce and Navigation.
3. The 8th, 9th and 10th Census of the United States.

I am also indebted to the heads of these departments for information sent me privately and in advance of their printed reports, for which I desire to express my thanks.

P. SCHWEITZER.

1. TOTAL PRODUCTION, VALUE AND AREA OF THE WHEAT CROP OF THE UNITED STATES, WITH SOME DETAILS.

	Bushels.	Dollars.	Acres.	Value per bu., cents.	Value p. acre, dollars.	Yield per acre, bushels.
1880	480,849,723	460,597,000	36,037,000	95.8	12.74	13.3
1879	448,756,600	497,080,100	32,545,950	110.8	15.27	13.8
1878	420,122,400	326,346,424	32,108,560	77 2	10.16	13.1
1877	364,194,146	394,695,779	26,277,548	108 2	15.08	13.9
1876	289,356,500	300,259,300	27,627,021	103.7	10.86	10.4
1875	292,136,000	294,580,990	26,381,512	100.0	11.16	11.0
1874	308,102,700	291,107,895	24,967,027	94 4	11.66	12.3
1873	281,254,700	328,594,805	22,171,676	115.0	14.59	12.7
1872	249,997,100	310,180,375	20,858,359	124.0	14 87	11.9
1871	230,722,400	290,411,820	19,943,893	125 8	14.56	11.5
1870	235,884,700	245,865,045	18,992,591	104.2	12 94	12.4
1869	260,146,900	244,924,120	19,181,004	94.1	12.76	13.5
1868	224,036,600	319,195,290	18,460,132	142.4	17.29	12.1
1867	221,441,400	421,796,460	18,321,561	198 5	23.02	11.5
1866	151,999,906	333,773,646	15,424,496	206.4	21 64	10.0
1865	148,522,827	217,330,195	12,304,894	146 8	17.66	12.1
1864	160,695,823	294,215,119	13,158,089	183.2	22.37	12.2
1863	173,677,928	198,249,108	13,098,936	140.8	15 12	13.2
1862	177,957,172	166,674,311	11,115,830	93.7	14.99	16.0

NOTE 1. *Department of Agriculture, special report No. 30, December 1, 1880, page 3*: "The public demand for annual statements of the agricultural production of the country led to the organization by Mr. Lewis Bollman, the first statistician of this department, of the system of collecting and compiling such statistics now in use, the basis or starting point of which is the United States census.

"The production of the year immediately following that of the census is carefully compared by a corps of county reporters, with the actual enumeration, and the result of the comparison is given in the form of a percentage of the census crops. This process is carried on from year to year, the estimates being checked whenever possible by comparison with official reports made by State authority, and corrected in all possible ways."

NOTE 2. The wheat statistics of the Department of Agriculture are made out at the end of the calendar year, and embrace not only the summer wheat, grown and harvested the same year, but the winter wheat also, which has been sown the fall preceding.

NOTE 3. The figures which are given by the census office for the total production of wheat are as follows:

1880.....459,811,555 bushels.
1870.....287,745,626 bushels.
1860.....173,104,924 bushels.

The differences between these figures and those of the Department of Agriculture prove on the whole the correctness of the system of computing the condition and yield of crops adopted and in force by the Department of Agriculture, and are still further explained by the statement on page 690, COMPENDIUM OF THE NINTH CENSUS OF THE UNITED STATES. "The census agricultural year. The first question, logically, which

arises in respect to what purports to be a statement of annual production, viz.; 'What is the year covered by the report?' is one which it is impossible to answer in respect to the tables of agricultural production in the census of the United States. The schedule annexed to and made a part of the law of 1850 requires the products of each farm in the United States 'for the year ending June 1.' But there is no agricultural year ending June 1. The division made by the law is a purely artificial one, and cuts the agricultural year in twain.

"As a matter of fact, as the census under existing laws always has been and always will be taken, the production returned is not the production of any one year distinctly, but is made up without any determinable proportions indifferently from the production of two years.

"The enumeration at the ninth census, for example, beginning upon the first of June, 1870, assistant marshals obtain for a month or two the production of 1869 in the main, although in some sections many of the crops (notably hay, wool and some of the grain crops) are already so far advanced that the farmer is quite as likely to estimate his annual production (it must be remembered that few of the statistics of production are obtained as transcripts from actual accounts) from his impressions in regard to the growing crop, as by recalling the experience of the previous year. As the enumeration progresses through September and October, the crop of 1870 is returned in increasing proportion earlier in some parts of the country than in others, and earlier in respect to some crops than to others in the same section. As the work is protracted through November and December, and through the utter want of control at the central office is allowed to drag in some counties, through January and February, the crop of 1870 becomes the only one that is in contemplation by either the farmer or the assistant marshal in filling up the agricultural schedule."

I would state here that many and important improvements in the taking of the tenth census have been enacted by Congress.

2. TOTAL EXPORT OF DOMESTIC WHEAT AND WHEAT-FLOUR IN BUSHELS AND BARRELS, AND THEIR VALUE.

	Bushels.	Dollars.	Barrels.	Dollars.	Total dollars.
1881	150,575,577	167,698,485	7,945,786	45,047,257	212,745,742
1880	153,252,795	190,546,305	6,011,419	35,373,197	225,919,502
1879	122,353,936	130,701,079	5,629,714	29,567,713	160,268,792
1878	72,404,961	96,872,016	3,947,333	25,095,721	121,967,737
1877	40,325,611	47,135,562	3,343,665	21,663,947	68,799,509
1876	55,073,122	68,382,899	3,935,512	24,433,470	92,816,369
1875	53,047,177	60,954,496	3,973,128	28,712,440	84,666,936
1874	71,039,928	101,421,459	4,094,094	29,258,094	130,679,553
1873	39,204,285	51,452,254	2,662,086	19,381,664	70,833,918
1872	26,423,080	38,915,060	2,514,535	17,955,684	56,870,744
1871	34,310,906	45,148,424	3,658,841	24,093,184	69,236,608
1870	36,588,115	47,171,229	3,463,338	21,169,593	68,340,822
1869	17,557,836	24,383,259	2,431,873	18,813,865	43,197,124
1868	15,940,899	30,247,632	2,076,423	20,887,798	51,135,430
1867	6,146,411	7,822,555	1,300,106	12,803,775	20,626,330
1866	5,579,103	7,842,749	2,188,050	18,396,686	26,239,435
1865	9,937,162	19,397,197	2,604,542	27,222,031	46,619,228
1864	23,681,712	31,432,133	3,557,347	25,588,249	57,020,382
1863	36,160,414	46,754,195	4,390,055	28,366,069	75,120,264
1862	37,289,572	42,578,295	4,882,033	27,534,677	70,107,972

NOTE.—The figures in this table as also those in tables 3, 4 and 5 are taken from the Reports of the Chief of the Bureau of Statistics, and are for the official years ending on June 30.

3. IMPORTS AND VALUES OF FOREIGN WHEAT AND WHEAT-FLOUR.

	Bushels.	Dollars.	Barrels.	Dollars.	Total bushels.	Total dollars.
1881	200,620	415,763	2,386	‡20,450	*210,761	436,213
1880	462,882	534,475	5,161	28,532	484,836	563,007
1879	2,011,291	1,794,562	12,606	59,756	2,064,866	1,854,318
1878	1,351,008	1,549,084	7,941	47,426	1,384,757	1,596,510
1877	828,906	372,693	7,431	50,878	860,486	423,566
1876	1,568,558	1,628,849	19,116	101,081	1,649,801	1,724,930
1875	308,047	312,464	12,988	73,800	359,246	386,264
1874	1,646,092	2,114,194	94,137	561,648	2,046,174	2,675,842
1873	1,476,594	2,052,994	72,891	453,478	1,786,881	2,506,472
1872	1,546,623	2,188,689	172,823	1,028,142	2,381,121	3,216,831
1871	717,179	933,253	30,061	163,650	844,942	1,096,903
1870	851,326	878,838	86,930	375,015	1,220,778	1,253,848
1869	1,370,493	1,718,406	91,980	458,083	1,761,408	2,176,489
1868	1,616,508	2,734,649	79,564	578,719	1,954,655	3,313,368
1867	1,924,890	3,264,275	238,522	1,778,930	2,917,358	5,043,205
1866	188,212	318,727	.....	.....	188,212	318,727
1865	1,303	1,336	.....	9,630	†10,695	10,966
1864	1,790,868	2,257,212	1,088,468	2,591,281	6,416,752	4,848,493

NOTE.—Blanks here and elsewere indicate that no figures are returned in the department reports.

*This column of figures was obtained, as in all where the totals in bushels are given, by allowing 4½ bushels of wheat to the barrel of flour; this is a lower estimate than is adopted by the Department of Agriculture in similar reductions, but is considered nearer the truth, since the art of milling has undergone of late such improvements that the rate of five bushels of wheat to the barrel of flour can obtain only in inferior mills. Mr. C. C. Washburn of Minneapolis, estimates of the hard and flinty summer wheats raised in the Northwest 5¼ bushels to the barrel of flour.

†This represents the number of bushels of wheat at the price given and for the sum of $10,966 in the next column.

‡The value given me by the Bureau of Statistics by letter is $204,508; this is evidently a mistake which I have sought to correct.

4. EXPORTS AND VALUES OF FOREIGN WHEAT AND WHEAT-FLOUR.

	Bushels.	Dollars.	Barrels.	Dollars.	Total bushels.	Total dollars.
1881	147,082	147,471	1,490	10,461	153,364	157,982
1880	617,140	679,042	2,924	15,888	628,567	694,930
1879	1,789,989	1,558,063	6,870	30,797	1,819,186	1,588,860
1878	1,249,660	1,420,707	5,549	27,950	1,274,243	1,448,657
1877	464,453	502,585	1,040	6,025	468,878	508,610
1876	1,368,706	1,392,484	10,451	50,803	1,418,123	1,443,287
1875	280,297	319,935	3,900	18,456	296,872	338,391
1874	793,821	1,013,519	46,112	270,955	989,797	1,284,474
1873	387,166	531,107	28,770	181,068	509,438	712,175
1872	579,905	792,289	84,921	510,686	940,819	1,302,975
1871	486,309	589,816	500	3,075	488,459	592,891
1870	412,470	428,402	19,697	89,452	505,182	517,854
1869	849,606	485,749	15,486	94,388	415,209	580,137
1868	192,293	309,356	9,860	99,559	284,198	480,915
1867	45,960	79,267	245,464	2,684,657	1,089,182	2,763,924
1866	82,167	89,476	48,200	365,840	287,017	405,816

5. IMPORTS FOR CONSUMPTION OF FOREIGN WHEAT AND WHEAT-FLOUR.

	Bushels.	Dollars.	Barrels.	Dollars.	Total bushels.	Total dollars.
*1881	.....	.....	.....	.....	.....	.....
1880	39,111	42,602	3,306	17,529	58,161	60,131
1879	12,128	14,350	3,370	18,350	26,450	32,700
1878	58,229	95,216	3,406	20,212	72,704	115,428
1877	37,482	59,946	6,736	46,429	66,110	106,375
1876	101,419	111,645	8,461	49,016	137,378	160,661
1875	48,680	52,092	8,886	54,989	81,445	107,081
1874	943,462	1,242,888	48,210	299,794	1,148,354	1,542,182
1873	1,056,845	1,465,171	50,630	317,612	1,271,522	1,792,783
1872	907,690	1,215,582	80,505	476,880	1,249,826	1,692,462
1871	218,824	285,754	29,060	157,805	341,829	443,559
1870	509,725	541,606	63,939	290,907	781,466	832,513
1869	1,144,619	1,941,928	61,623	455,072	1,406,517	2,397,000
1868	2,302,599	3,886,595	†201,190	1,485,741	3,157,656	5,322,336

*The heading for this year has apparently been changed into "Net Imports of Foreign Wheat and Foreign Wheat-Flour," and the differences between the figures given under tables 3 and 4 drawn and placed here; this could not have been done heretofore, as will appear by a comparison of the same tables of older date, since often more foreign wheat and flour is reported exported than imported. The figures for 1881 are thus, as follows, making the correction indicated in table 3, note 3: Bushels, 53,588; dollars, 268,292; barrels, 896; dollars, 9,989.

†This figure is not given by the Chief of the Bureau of Statistics, and has been supplied by me on the basis of the cost of flour for the previous year; it is very likely a fair estimate, since there is little difference in the price of wheat for the two years.

6. TOTAL PRODUCTION AND EXPORTATION OF DOMESTIC WHEAT, WITH QUANTITIES RETAINED AT HOME AND FOR SEED.

	Total production.	Total exportation	Export.	Retained at home	Retained as seed
	Bushels.	*Bushels.	P. C. of product.	Bushels.	†Bushels.
1880	480,849,723	184,345,167	38.33	296,504,556	.....
1879	448,756,900	178,801,326	39.84	269,955,274	54,055,500
1878	420,122,400	146,280,220	34.82	275,842,180	48,818,925
1877	364,194,146	89,181,126	24.04	275,013,020	48,162,840
1876	289,356,500	54,535,937	18.85	234,820,563	39,416,322
1875	292,186,000	71,799,048	24.58	220,386,952	41,440,581
1874	308,102,700	69,932,971	22.70	238,169,729	39,572,268
1873	281,254,700	86,439,827	30 73	194,814,873	37,450,540
1872	249,997,100	50,518,150	20.21	199,478,950	33,257,514
1871	230,722,400	37,109,854	16.08	193,612,546	31,287,588
1870	235,884,700	49,839,730	21.13	186,044,970	29,915,839
1869	260,146,900	51,302,003	19 72	208,844,897	28,488,856
1868	224,036,600	27,898,296	12.45	196,143,304	28,771,506
1867	212,441,400	24,765,697	11.66	187,675,703	27,690,198
1866	151,999,906	11,671,861	7.68	140,328,045	27,482.341
1865	148,522,827	14,857,065	10.00	133,665,762	23,136 744
1864	160,695,828	21,006,455	13 07	139,689,368	18,457,341
1863	178,677,928	38,800,437	22 84	134,877,491	19,787,183
1862	177,957,172	54,818,148	30.80	123,139,024	19,648,404
1861	.....	58,038,212	.....	.....	16,673,745

*The figures given here represent the total export for the years ending on the 30th of June, following; thus, f. e. 184,345,167 is the total export of wheat for the year ending on June 30, 1881, but since none of this wheat could be of the crop of 1881, it must have come from the crop of the previous year, 1880, and from this, i. e., the total crop, it was subtracted, the difference appearing under the heading, Retained at Home.

†These figures were obtained by allowing 1½ bu. of seed to the acre, the number of acres being those given for the next year by the Commissioner of Agriculture; for the year 1880–81 I am unable to give any figures, but it is probable that the acreage will not be much larger than that reported for 1880.

7. TOTAL IMPORT AND EXPORT OF FOREIGN WHEAT WITH QUANTITIES RETAINED AT HOME, AND TOTALS FOR HOME CONSUMPTION.

	Total Import.	Total export.	Retained at home.	Retained for home consumption aside from next year's seed.	
	*Bushels.	Bushels.	†Bushels.	Bushels.	‡Dollars.
1881	.....	.....	....‖	.....	.....
1880	537,997	628,567	-90,570	242,432,469+	232,250,305
1879	2,091,316	1,819,186	272,130	215,990,554	239,817,584
1878	1,457,461	1,274,243	183,218	227,250,929	175,437,717
1877	426,596	468,873	-42,277	226,920,651	245,528,144
1876	1,787,179	1,413,123	374,056	195,570,131	202,806,226
1875	440,691	296,872	143,819	179,155,358	179,155,358
1874	8,194,528	989,797	2,204,731	199,771,735	188,584,518
1873	3,057,903	509,438	2,548,465	159,740,928	183,702,067
1872	3,530,947	940,819	2,590,128	168,790,782	209,300,508
1871	1,186,771	488,459	698,312	163,969,228	206,273,289
1870	2,002,244	505,182	1,497,062	157,226,818	163,830,344
1869	3,167,925	415,209	2,752,716	182,480,900	171,714,527
1868	5,112,311	234,198	4,878,113	171,187,212	243,770,590
1867	2,917,358	1,089,182	1,828,176	163,338,649	324,227,218
1866	188,212	237,017	-48,805	113,735,890	234,749,845
1865	10,695	.....	10,695	110,509,963	161,676,076
1864	6,416,752	.....	6,416,752	124,445,750	103,538,864
1863	....	.....	....	118,348,734	166,685,017
1862	.....	.....	....	103,490,620	96,970,711

*This column embraces the figures given in tables 3 and 5.

†These figures are given for the official years ending June 30; to take account of them in the column following, it was assumed that one-half of each represented the number of bushels retained for the six months, either ending on June 30, or December 31: for the calendar year 1879, f. e. ½ of (-90 570 and +272.180) represent the number of bushels retained, i. e., 90.780.

‡These figures were obtained by multiplying the number of bushels of wheat obtained in the previous column with the average price p. bu. of wheat produced.

‖The number of bushels retained at home, as given previously, is 57.896. See table 5, note.

+Allowing for seed the same amount that was retained the year before, i. e., 54,055,500 bushels. See table 6, note.

8. POPULATION OF THE UNITED STATES, WITH CONSUMPTION OF WHEAT PER CAPUT, AND THE AVERAGE VALUE PER BUSHEL OF WHEAT PRODUCED, EXPORTED AND EXPORTED AS FLOUR.

	‡ Population.	Consumption per caput, (¿)		Average produced.	Average value per bushel produced.		*	†
					Exported.	Exported as flour.		
		Bushels.	Cents.	Cents.	Cents.	Cents.		
1880	50,152,366	4.834	468 10	95.8	124.3	138.4	14.1	28.5
1879	49,041,246	4 404	487.96	110 8	106.8	123 6	16.8	-4.0
1878	47,798,486	4.754	367.0	77.2	133.8	149.6	15.8	56.6
1877	46,587,219	4.871	527.0	108.2	116 9	152.4	35.5	8.7
1876	45,406,646	4.307	446.6	103.7	124.2	146.1	21 9	20.5
1875	44,255,991	4 048	404.8	100.0	112.3	140 4	28.1	12.3
1874	43,134,495	4 681	487.2	94.4	142.8	168.1	25.3	48.4
1873	42,041,419	3.800	487.0	115.0	131.3	171.3	40 0	16.3
1872	40,976,042	4 119	510.8	124.0	147.3	168.0	20.7	23.3
1871	39,937,668	4.106	516.5	125.8	181.6	155.2	23.6	5.8
1870	38,925,598	4.039	418 7	104.2	128.9	143.8	14.9	24.7
1869	38,087,669	4 791	444.7	94.1	138.9	182.0	43.1	44.8
1868	37,267,778	4.593	640 1	142 4	189.7	236.7	47.0	47.3
1867	36,465,536	4.479	881.6	198 5	127.3	231.7	104.4	-71.2
1866	35,680,568	3.188	652 2	206 4	140.6	198 3	57.7	-65.8
1865	34,912,488	3.165	456.1	146.8	195 2	245.9	50.7	49.9
1864	34,160,947	3.643	659.1	188.2	132.7	169.2	36.5	-50.5
1863	33,425,584	3.541	489.0	140.8	129.8	152.0	22.7	-11 5
1862	32,706,061	3.164	287.0	93.7	114 2	132.7	18.5	20.5
1861	32,064,756	.....	.....	.....	.....	.....	.....	.....
1860	31,443,321	.....	.....	.....	.....	.....	.....	.....

NOTE—Increase of population from 1860 to 1870=23.796 per cent.
Increase of population from 1870 to 1880=28.842 per cent.

‡ This table has been calculated by assuming a yearly increase of population in the following ratio: 2 per cent. from 1860 to 1862; 2.2 per cent. from 1862 to 1870; 2.6 per cent. from 1870 to 1880, beginning the calculation back and forward with the figure given for 1870; this makes the population for 1860, 31,436,035, a minus of 7,286 under the true population, and for 1880, 50,316,318, a plus of 163,452 over the true population. See Elliott's estimates of population, published by the Bureau of Statistics. The figures given for the years 1860, 1870 and 1880, are those given by the United States ce sus.

¿ Report of Department of Agriculture for 1878, page 319: "It has been estimated and accepted as a fact in Europe. that the consumption of grain for the whole country is 15½ bushels per caput annually."

* Difference in the value of wheat exported as such and as flour, both calculated for one bushel. This difference, assuming the cost of transportation to be the same in both cases, should represent the cost of grinding, barrelling and handling 1 bushel of wheat.

† Difference in the value of wheat produced and exported, both calculated for one bushel. The difference should represent cost of transportation and handling; the figures indicated by a minus sign seem to indicate that during the years thus marked, money was actually lost by exporting wheat.

Russia produces 23 bushels per caput.
Prussia produces 22.7 bushels per caput.
France produces 19.5 bushels per caput.
Hungary produces 19.3 bushels per caput.
Belgium produces 14 bushels per caput.
Ireland produces 13 bushels per caput.
Great Britain produces 11.9 bushels per caput.
Holland produces 9 bushels per caput.
Italy produces 8 bushels per caput.

The United States produced in 1880 9.6 bushels of wheat per caput; the small consumption of wheat here indicates clearly that large numbers of people live mainly on corn, and all consume a larger quantity of meat than Europeans.

9. POPULATION OF MISSOURI WITH QUANTITY OF WHEAT CONSUMED, AND BOUGHT BY OR SOLD FROM THE STATE, WHEN REACHING OVER, OR FALLING UNDER ITS OWN PRODUCTION.

	*Population.	†Consumed bushels of wheat.	‡Quantity and value of wheat bought or sold by State.	
			Bushels.	Dollars.
1880	2,168,804	10,488,998	‡20,204,002	17,981,562
1879	2,112,208	9,302,142	‡17,499,458	17,674,453
1878	2,064,715	9,815,655	‡10,380,345	6,954,831
1877	2,018,294	9,831,110	‡10,168,890	10,168,890
1876	1,972,917	8,497,353	‡ 6,742,847	6,000,956
1875	1,928,561	7,806,815	‡ 8,358,185	3,185,536
1874	1,885,201	8,730,366	‡ 6,654,634	5,523,346
1873	1,842,817	7,002,705	‡ 4,924,295	5,564,453
1872	1,801,385	7,419,905	‡ 275,095	367,884
1871	1,760,885	7,230,194	‡ 5,594,806	6,489,975
1870	1,721,295	6,952,810	‖ 202,310	184,102
1869	1,655,091	7,929,541	‖ 429,541	343,633
1868	1,591,355	7,509,093	‖ 2,152,093	3,206,619
1867	1,530,149	6,853,587	‖ 1,892.537	3,785,074
1866	1,471,297	4,690,495	‖ 1,146,459	2,304,383
1865	1,414,709	4,477,554	‖ 1,524,191	2,484,431
1864	1,360,297	4,955,562	‖ 1,674,048	2,929,584
1863	1,307,971	4,631,525	‖ 1,777,904	1,813,463
1862	1,257,664	8,979,249	‡ 1,657,532	1,276,309
1861	1,213,961	.....	.....	.....
1860	1,182,012	.....	.....	.....

NOTE—Increase of population from 1860 to 1870—45.624 per cent.
Increase of population from 1870 to 1880—26.015 per cent.

* The calculations for this column were made by allowing a yearly increase of 4 per cent., beginning with the population for 1870, except that the increase from 1860 to 1862, was made annually, 3.60 per cent., and that from 1870 to 1880, 2.8 per cent. This would give the population for 1860 as 1,171,777, a minus of 10,235, and for 1880 as 2,160,784, a minus of 8,600 below the true figures. This increase in the population is for the two first years 1.8 times as great, and for the next eight years 1.818 times as great as the average for the United States. The figures given for the years 1860, 1870 and 1880, are those given by the United States census.

† This column was calculated by allowing the average consumption per caput obtained for the United States.

‡ These two columns were obtained by subtracting the quantity produced from the quantity consumed, or *vice versa*, and the value determined from the price per bushel in Missouri; the quantities bought by the State are indicated by a ‖ sign, the quantities sold by a ‡ sign.

10. EXPORTS OF WHEAT AND WHEAT-FLOUR FROM NEW YORK AND FROM SAN FRANCISCO, WITH PRICE PER BUSHEL.

		Bushels.	Dollars.	Barrels.	Dollars.	Price per bu.		Price per bbl.	
						Cents	Differ.	Cents.	Differ.
1881	N. Y.	57,001,171	68,475,142	4,520,168	25,640,366	120.1	34.9	567.3	121.8
1881	S. F.	22,029,331	18,760,362	650,758	2,899,014	85.2	.....	445.5	.....
1880	N. Y.	67,307,343	86,388,410	3,628,291	20,715,341	128.3	14.0	570.9	36.8
1880	S. F.	17,801,700	20,346,691	467,170	2,495,252	114 3	.....	534.1	.....
1879	N. Y.	55,485,183	60,197,408	3,236,292	16,899.547	108 5	5.5	522.2	15 9
1879	S. F.	16,723,302	17,281,044	528,105	2,673,884	103.0	.....	506 3	.....
1878	N. Y.	39,101,511	52,987,916	2,195,388	13,722,627	135 5	1.1	625.1	.....
1878	S. F.	6,627,337	8,909,230	423,551	2,697,408	134.4	.....	636.9	11 8
1877	N. Y.	13,561,751	17,425,359	1,463,933	9,619,517	128 5	21.4	657.1	104.6
1877	S. F.	16,840,184	18,085,056	501,658	2,772,023	107.1	.....	552.5	.....
1876	N. Y.	31,431,183	39,974,777	2,669,174	12,955,172	127.2	7.2	626 1	80.0
1876	S. F.	9,693,231	11,653,851	424,928	2,320,566	120.0	.....	546.1	.....
1875	N. Y.	24,722,963	30,611,165	1,966,740	12,000,413	123.8	31.1	610.2	131 9
1875	S. F.	14,469,958	13,407,691	452,984	2,166,608	92.7	.....	478.3	.....
1874	N. Y.	41,482,167	62,223,891	2,098,086	15,049,823	150.0	20.7	717.3	85.2
1874	S. F.	11,514,578	14,894,414	598,240	3,781,531	129.3	.....	632.1	.....
1873	N. Y.	15,095,260	23,798,088	1,361,332	10,522,249	157.6	49.1	772.9	157.4
1873	S. F.	15,996,162	17,358,543	257,765	1,326,254	108.5	.....	514.5	.....
1872	N. Y.	17,889,087	27,444,656	1,138,085	8,137,163	153.4	13.6	715.0	104.2
1872	S. F.	2,263,085	3,164,460	267,083	1,631,443	139 8	.....	610.8	.....
1871	N. Y	18,090,794	25,626,129	2,041,892	13,366,072	141.6	21.7	654 6	62.5
1871	S. F.	5,903,427	7,080,510	198,223	1,173,638	119 9	.....	592.1	.....
1870	N. Y.	20,077,434	28,154,215	1,896,004	11,614,663	140 2	36.6	612.6	129.8
1870	S. F.	7,939,030	8,221,915	340,736	1,644,944	103.6	.....	482.8	.....
1869	N. Y.	8,379,921	13,265,173	1,144,476	9.183,912	158.3	45.5	802.3	268.2
1869	S. F.	5,530,624	6,236,268	390,519	2,085,669	112.8	.....	534 1	.....
1868	N. Y.	7,208,337	16,716,237	1,111,448	11,653,193	231.9	95.9	1048.5	413.4
1868	S. F.	5,542,303	7,538,962	277,642	1,763,395	136.0	.....	635.1	.....
1867	N. Y.	424,425	803,191	622,221	6,841,087	189.2	78.7	1099.5	547.6
1867	S. F.	4,883,282	5,895,988	283,874	1,566,737	110 5	.....	551.9	.....

NOTE.—No figures were accessible later than 1867.

The value returns from San Francisco are made in gold coin, which accounts, to some extent, for the differences in price at the two ports, but the balance is still in favor of San Francisco as a cheaper export market for wheat than New York.

11. INTRANSITU SHIPMENTS OF WHEAT AND WHEAT-FLOUR. EXPORTS OF STARCH. (IS THIS WHEAT STARCH?)

	Intransitu shipments of wheat and wheat-flour.				Exports of starch.	
	Bushels.	Dollars.	Barrels.	Dollars.	Pounds.	Dollars.
1880	3,027,107	3,685,492	558,104	3,082,464	10,311,736	447,842
1879	2,555,842	2,339,789	327,804	1,541,616	14,298,654	601,797
1878	1,988,220	2,289,251	276,547	1,651,917	12,995,885	605,521
1877	344,671	390,410	370,849	2,193,577	8,687,816	454,282
1876	2,708,979	2,955,612	926,986	5,960,259	9,685,552	524,956
1875	1,208,197	1,285,186	537,245	4,087,541	7,382,862	442,682
1874	617,018	746,988	596,837	5,209,449	7,435,064	420,809
1873	163,266	289,261	410,303	3,845,281	6,138,823	327,940
1872	328,566	479,606	804,288	2,680,151	3,331,763	165,415
1871	160,481	198,426	260,816	1,843,421	1,761,873	115,698
1870	314,141	335,152	495,729	2,977,237	1,301,962	107,187
1869	169,217	178,646	357,586	1,876,949	1,865,078	162,025
1868	100,174	162,059	295,750	2,124,946	2,340,348	205,481
1867	.....	.....	.....	.....	2,004,745	171,011
1866	.....	.....	.....	.....	974,546	93,307
1865	.....	.....	.....	.....	2,149,316	211,102

NOTE.—This table is published to serve in the computation of the transportation of wheat.

12. LENGTH OF RAILROADS IN THE UNITED STATES AND IN MISSOURI, WITH THE NUMBER OF INHABITANTS TO ONE MILE OF RAILROAD.

	In U. S.	In Mo.	Mo. to U. S.	P. C. of Increase of Miles.		U. S.	Mo.
	Miles of R.R	Miles of R. R	Per Cent.	For U.S over previous y'r	For Mo. over previous y'r	Capita to 1 Mile.	Capita to 1 Mile.
1880	*90,000	4,000	4.44	4.0	10.6	557.3	542.2
1879	86,497	3,615	4.18	5.7	12.8	566.9	584.3
1878	81,841	3,205	3.92	3 4	0.5	584.0	644 2
1877	79,147	3,190	4 03	3.0	1 6	588.6	632.7
1876	76,808	3,140	4.09	3 7	2.9	591.2	628.3
1875	74,096	3,050	4 12	2.4	5.9	597.3	632.3
1874	72,388	2,880	3.98	2.9	0.8	595.9	654.6
1873	70,278	2,858	3 92	6 2	6.9	598.2	644.8
1872	66,171	2,678	4.04	9.8	3.6	619.3	678.9
1871	60,283	2,580	4.28	13 9	29.0	662.5	643.8
1870	52,915	2,000	3.78	12.9	16.8	735.6	860.6
1869	46,845	1,712	3.65	10.9	26.4	813.0	966.7
1868	42,230	1,354	3.26	7.6	2.4	882.5	1175.3
1867	39,250	1,085	2.76	6 6	7.3	929.1	1410.3
1866	36,800	925	2.52	4.9	10.0	969.6	1590.6
1865	35,085	925	2.63	8.5	0.0	995.1	1529.4
1864	33,908	925	2.73	2.2	6.6	1007.5	1470.6
1863	33,170	868	2 62	3.3	3.6	1007.7	1506.9
1862	32,120	838	2 61	.....	.....	1018.2	1500.1

Increase of miles of railroad from 1862 to 1870 for United States, 64.74 per cent.; for Missouri, 138.66 per cent.

Increase of miles of railroad from 1870 to 1880 for United States, 70.09 per cent.; for Missouri, 200.00 per cent.

* This figure is not quite exact, the official reports being at the time inaccessible; but the true number of miles of railroad is probably 93,671. Mr. George C. Pratt, Railroad Commissioner of the State of Missouri, furnished me kindly with the figures embodied in the table.

13. 1880.

	States.	Per acre, bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Connecticut	20.0	$1 40	Connecticut	$28 00	Illinois	53,767,200
2	Ohio	18.0	1 02	Massachusetts	22 10	California	45,760,000
3	Michigan	17.8	97	Vermont	21 28	Minnesota	40,752,000
4	Indiana	17.8	99	NewHampshire	21 00	Indiana	38,341,990
5	Illinois	17.2	95	New York	19 89	Ohio	37,792,800
6	Massachusetts	17.0	1 30	New Jersey	19 89	Iowa	36,098,400
7	New York	17.0	1 17	Ohio	18 36	Michigan	30,705,000
8	New Jersey	17.0	1 17	Maine	18 08	*Missouri*	30,688,000
9	Oregon	17.0	78	Delaware	18 05	Pennsylvania	22,299,650
10	California	16.0	96	Michigan	17 27	Kansas	19,850,000
11	Vermont	16.0	1 88	Indiana	17 03	Nev., Col. Ter.	18,005,000
12	Delaware	15.7	1 15	Pennsylvania	17 02	Wisconsin	16,464,000
13	Pennsylvania	15.0	1 13	Illinois	16 34	New York	12,931,237
14	NewHampshire	15.0	1 40	Maryland	15 96	Oregon	12,920,000
15	Minnesota	14.4	87	California	15 36	Nebraska	10,206,000
16	*Missouri*	14.0	89	Oregon	13 26	Virginia	9,322,350
17	West Virginia	14.0	91	West Virginia	12 74	Tennessee	9,309,600
18	Maryland	14.0	1 14	Minnesota	12 53	Maryland	7,485,500
19	Nev., Col. Ter.	13.0	80	*Missouri*	12 46		
20	Maine	12.3	1 47	Nev., Col. Ter.	10 40		
21	Iowa	10.4	81	Virginia	9 97		
22	Kansas	10.0	70	Wisconsin	9 80		
23	Wisconsin	9 8	1 00	Texas	8 92		
24	Virginia	9.5	1 05	Mississippi	8 77		
25	Kentucky	8.9	93	Iowa	8 42		
26	Nebraska	8.8	73	Kentucky	8 28		
27	Texas	8.5	1 05	Georgia	8 25		
28	Arkansas	7.0	1 02	North Carolina	7 36		
29	Mississippi	6.8	1 29	Arkansas	7 14		
30	North Carolina	6.4	1 15	Kansas	7 00		
31	Georgia	6.3	1 31	South Carolina	6 77		
32	Tennessee	6 0	98	Alabama	6 53		
33	Alabama	5.4	1 21	Nebraska	6 42		
34	South Carolina	4 8	1 41	Tennessee	5 88		

The office of the tenth census of the United States makes the following returns:

	States.	Bushels produced.
1	Illinois	51,110,500
2	Indiana	47,284,853
3	Ohio	46,014,889
4	Michigan	35,532,543
5	Minnesota	34,601,036
6	Iowa	31,154,206
7	California	29,017,707
8	*Missouri*	24,966,637
9	Wisconsin	24,884,689
10	Pennsylvania	19,462,406
11	Kansas	17,324,141
12	Nebraska	13,847,007
13	Kentucky	11,356,113

In the value per acre of corn Missouri stands No. 28; in the value per acre of all field products, No. —.

Missouri produces 6.38 per cent. of all the wheat grown in the United States, standing No. 8 in the list of wheat-producing States.

14. 1879.

	States.	Per acre, bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Indiana	20.8	$1 17	Massachusetts	$27 00	Illinois	44,896,880
2	Ohio	19 5	1 20	Conecticut	27 00	Indiana	43,709,960
3	Michigan	19.2	1 17	Indiana	23 75	Ohio	36,591,750
4	Illinois	18.7	1 07	Ohio	23 40	California	35,000,000
5	Massachusetts	18.0	1 50	Maine	23 04	Iowa	32,786,880
6	Connecticut	18 0	1 50	Michigan	22 46	Minnesota	31,886,520
7	Maine	16.0	1 44	Vermont	21 13	Michigan	28,773,120
8	Oregon	16.0	98	New York	21 00	*Missouri*	26,801,600
9	Pennsylvania	15.3	1 32	Maryland	20 45	Pennsylvania	22,807,400
10	Vermont	15.2	1 39	Pennsylvania	20 20	Wisconsin	20,565,720
11	New York	15.0	1 40	Illinois	20 01	Kansas	18,089,500
12	Maryland	14.4	1 42	Delaware	17 94	Nev., Col. Ter	16,900,000
13	California	14.0	1 23	New Hampshire	17 55	Nebraska	13,043,590
14	Kentucky	14.0	1 08	California	17 22	Tennessee	11,852,800
15	*Missouri*	14.0	1 01	New Jersey	16 97	New York	10,746,000
16	Delaware	13.0	1 38	Oregon	15 68	Virginia	8,851,320
17	West Virginia	13.0	1 08	Kentucky	15 12	Oregon	8,188,800
18	Nev., Col. Ter	13.0	1 06	*Missouri*	14 14	Kentucky	7,681,800
19	Wisconsin	12.6	1 04	West Virginia	14 04	Maryland	6,999,840
20	New Jersey	12.3	1 38	Nev., Col. Ter	13 78		
21	Minnesota	12.3	94	South Carolina	13 19		
22	New Hampshire	11.7	1 50	Wisconsin	13 10		
23	Nebraska	11.3	84	Virginia	11 68		
24	Kansas	11.0	89	Minnesota	11 56		
25	Iowa	10.2	92	Georgia	11 34		
26	Virginia	9.2	1 27	Alabama	11 09		
27	Georgia	9 0	1 26	Mississippi	9 79		
28	South Carolina	8.4	1 57	Kansas	9 79		
29	Alabama	8.4	1 32	Nebraska	9 49		
30	Arkansas	8 0	1 07	Iowa	9 38		
31	Tennessee	8.0	1 09	North Carolina	8 96		
32	Texas	7.6	1 15	Texas	8 74		
33	Mississippi	7 2	1 36	Tennessee	8 72		
34	North Carolina	7.0	1 28	Arkansas	8 56		

In the value per acre of corn *Missouri* stands No. 25 ; in the value per acre of all field products No. 28.

Missouri produces 5.79 per cent. of all the wheat-grown in the United States, standing No. 8 in the list of wheat-producing States.

15. 1878.

	States.	Per acre. bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Massachusetts	22.0	$1 50	Massachusetts	$83 00	California	41,990,000
2	Oregon	21.0	92	New Hampshire	20 72	Indiana	33,136,000
3	New York	19.0	1 02	Vermont	19 55	Ohio	33,120,000
4	Michigan	18.8	85	New York	19 38	Illinois	31,620,000
5	Ohio	18.0	86	Oregon	19 32	Iowa	30,440,960
6	California	17.0	1 03	Maine	18 34	Minnesota	28,824,000
7	Vermont	17 0	1 15	California	17 51	Michigan	27,889,200
8	Kansas	16.3	59	New Jersey	15 90	Kansas	27,221,000
9	Texas	16 0	86	Michigan	15 55	Pennsylvania	22,095,000
10	Indiana	16 0	81	Ohio	15 48	Wisconsin	21,154,000
11	New Jersey	15.0	1 06	Pennsylvania	14 55	*Missouri*	20,196,000
12	Pennsylvania	15.0	97	Texas	13 76	Nev., Col. Ter.	15,600,000
13	Maine	14 0	1 81	Connecticut	13 26	New York	14,128,400
14	New Hampshire	14.0	1 48	Delaware	13 00	Tennessee	7,935,000
15	Illinois	13.6	75	Indiana	12 96	Oregon	7,665,000
16	Nebraska	13 1	49	Maryland	12 74	Texas	7,200,000
17	Connecticut	13.0	1 02	Illinois	10 20	Virginia	7,068,240
18	Delaware	13.0	1 00	West Virginia	9 89	Maryland	6,883,000
19	Maryland	13.0	98	Kansas	9 62		
20	Wisconsin	12.4	67	Mississippi	9 18		
21	Minnesota	12 0	51	Wisconsin	8 31		
22	Nev., Col. Ter.	12.0	60	Georgia	8 28		
23	West Virginia	11.5	86	*Missouri*	7 78		
24	*Missouri*	11.0	67	Alabama	7 66		
25	Iowa	9 4	50	Nev., Col. Ter.	7 20		
26	Kentucky	9.3	76	South Carolina	7 15		
27	Alabama	7.8	1 05	Kentucky	7 07		
28	Virginia	7.2	89	North Carolina	6 50		
29	Georgia	7.0	1 18	Nebraska	6 42		
30	Mississippi	6.8	1 35	Virginia	6 41		
31	North Carolina	6.5	1 00	Minnesota	6 12		
32	Arkansas	6.0	95	Arkansas	5 70		
33	South Carolina	5.5	1 30	Iowa	4 70		
34	Tennessee	5.0	84	Tennessee	4 20		

In the value per acre of corn *Missouri* stands No. 26; in the value per acre of all field products No. 29.

Missouri produces 4.81 per cent. of all the wheat grown in the United States, standing No. 11 in the list of wheat-producing States.

16. 1877.

States.	Per acre, bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
Massachusetts...	22 0	$1 50	Massachusetts ..	$33 00	Iowa.....	37,810,000
Oregon..... ...	20.0	1 11	Vermont..... ...	27 55	Minnesota.....	33,324,346
Vermont.....	19.0	1 45	New Hampshire	27 20	Illinois.....	33,000,000
Minnesota.....	18.5	91	Connecticut.....	24 65	Ohio.....	26,000,000
New York.....	18.0	1 22	Maine.....	22 40	Indiana.....	24,600,000
Nev., Col. Ter...	18.0	1 05	Oregon.....	22 20	Wisconsin.....	22,000,000
Michigan.....	17 5	1 22	New York..	21 96	California.....	22,000,000
New Hampshire	17.0	1 60	Michigan.....	21 35	Michigan.....	21,890,000
Connecticut.....	17.0	1 45	New Jersey.....	19 73	*Missouri*.....	20,000,000
Illinois.....	16 5	1 04	Delaware.....	18 90	Pennsylvania...	18,200,000
Wisconsin.....	15 0	93	Nev., Col. Ter..	18 90	Kansas,...	14,400,000
Ohio.....	15.0	1 24	Maryland.....	18 63	New York.....	12,800,000
Nebraska...	15 0	83	Ohio.....	18 60	Tennessee.....	11,400,000
Indiana.....	14.5	1 13	Pennsylvania...	17 68	Virginia.....	9,450,000
Iowa.....	14.5	87	Illinois.....	17 16	Kentucky.....	7,150,000
Maine.....	14.0	1 60	Minnesota	16 83	Oregon.....	6,875,000
Missouri.....	14 0	1 00	Indiana.....	16 38	Maryland.....	6,780,000
Maryland.....	13 8	1 35	South Carolina.	15 34	Nebraska.....	5,640,000
New Jersey.....	13 8	1 43	West Virginia..	15 12	Nev., Col. Ter..	5,500,000
Delaware	13.5	1 40	Texas.....	14 52	Texas.....	4,800,000
Kansas.....	13.5	82	*Missouri*	14 00	.....	.....
Pennsylvania....	13.0	1 36	Wisconsin.....	13 95	.....	.....
Kentucky	12.5	99	Georgia.....	12 92	.....	.....
West Virginia...	12.2	1 24	Iowa.....	12 61	.....	.....
Texas.....	12 0	1 21	Kentucky	12 37	.....	.....
Virginia.....	10 4	1 18	Nebraska.....	12 45	.....	.....
South Carolina	9 9	1 55	California...	12 35	....	.....
California	9.5	1 30	Virginia.....	12 27	....	.....
Georgia.....	9.5	1 36	Mississippi.....	11 36	....	.....
Arkansas.....	9.0	88	Kansas.....	11 07	.....	.....
Tennessee.....	8.4	1 04	North Carolina.	9 04	.....	.....
North Carolina.	8.3	1 09	Tennessee.....	8 73	.....	.....
Mississippi.....	8.0	1 42	Alabama.....	8 05	.....	.....
Alabama	7.0	1 15	Arkansas.....	7 92	.....	.....

In the value per acre of corn *Missouri* stands No. 30; in the value per acre of all field products, No. 26.

Missouri produces 5.49 per cent. of all the wheat grown in the United States, standing No. 9 in the list of wheat-producing States.

17. 1876.

	States.	Per acre, bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Nevada Ter.....	18.2	$1 05	Massachusetts..	$23 40	California.....	30,000,000
2	Massachusetts..	18 0	1 30	N. Hampshire ..	23 25	Illinois.....	23,440,000
3	Oregon.....	17.0	70	Vermont.....	21 02	Ohio.....	21,750,000
4	Delaware.....	16.0	1 27	Delaware.....	20 32	Indiana.....	20,000,000
5	N. Hampshire...	15.0	1 55	New York.....	19 65	Pennsylvania...	18,740,000
6	New York.....	15 0	1 31	Nevada Ter.....	19 11	Iowa.....	17,600,000
7	Vermont...	14.7	1 43	Maine.....	18 96	Wisconsin.....	16,800,000
8	Kansas.....	14.6	86	Connecticut.....	18 85	Kansas.....	16,510,000
9	Connecticut.....	14.5	1 30	New Jersey	17 95	Minnesota..	16,000,000
10	New Jersey.....	13 6	1 32	Pennsylvania...	16 50	*Missouri*.....	15,240,000
11	Pennsylvania...	13.2	1 25	Maryland.....	15 87	Michigan.....	15,170,000
12	California.....	13.0	1 14	California.....	14 82	Tennessee.....	11,260,000
13	Texas.....	13.0	1 08	Texas.....	14 04	New York.....	9,750,000
14	Maryland.....	12 5	1 27	Michigan	13 92	Kentucky.....	8,237,000
15	*Missouri*....	12.4	1 89	Ohio.....	13 45	Virginia.....	7,875,000
16	Maine.....	12.0	1 58	South Carolina.	13 28	Maryland.....	6,000,000
17	Michigan	12 0	1 16	Kansas.....	12 55	Texas.....	4,750,000
18	Ohio.....	11.8	14	West Virginia..	12 21	Oregon.....	4,675,000
19	Nebraska	11.5	27	Oregon.....	11 90	Nebraska	4,330,000
20	West Virginia..	11.0	1 11	Indiana.....	11 22	.....	.....
21	Indiana.....	11.0	1 02	*Missouri*.....	11 03	.....	.....
22	Kentucky..	10 0	1 00	Mississippi.....	10 62	.....	.....
23	Illinois.....	9.3	93	Kentucky.....	10 00	.....	.....
24	Wisconsin..... ...	9.0	1 01	Virginia.....	9 60	.....	.....
25	Virginia.....	8 5	1 13	Wisconsin.....	9 09	.....	.....
26	Minnesota.....	8.5	90	North Carolina.	8 76	.....	.....
27	Tennessee.....	8.3	93	Illinois.....	8 64	.....	.....
28	Arkansas.....	8.2	95	Nebraska.....	8 39	.....	.....
29	South Carolina..	8.0	1 66	Georgia.....	8 04	.....	.....
30	Mississippi... ...	7.7	1 38	Alabama.....	7 99	.....	.....
31	North Carolina.	7.3	1 20	Arkansas.....	7 79	.....	.....
32	Alabama.....	6 5	1 23	Tennessee.....	7 71	.....	.....
33	Iowa.	6.1	90	Minnesota.....	7 65	.....	.....
34	Georgia.....	6.0	1 34	Iowa.....	5 49	.....	.....

In the value per acre of corn *Missouri* stands No. 29; in the value per acre of all field products, No 23.

Missouri produces 5.11 per cent. of all the wheat grown in the United States, standing No. 10 in the list of wheat-producing States.

18. 1875.

	States.	Per acre bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Nevada Ter.....	19.3	$1 00	New Hampshire	$27 88	Iowa.....	29,800,000
2	Texas.....	18.0	1 27	Vermont.....	27 12	Illinois.....	27,300,000
3	Oregon.....	17.6	87	Maine.....	22 96	Minnesota.....	27,200,000
4	Vermont.....	17.5	1 55	Texas.....	22 86	Wisconsin.....	25,200,000
5	New Hampshire	17.0	1 64	Massachusetts..	21 92	California.....	23,800,000
6	Kansas.....	17.0	87	Connecticut.....	21 28	Ohio.....	17,500,000
7	Minnesota.....	17.0	86	Nevada Ter.....	19 30	Indiana.....	17,280,000
8	Massachusetts...	16 0	1 37	Delaware.....	18 90	Michigan.....	16,870,000
9	Connecticut.....	16.0	1 33	Pennsylvania...	17 80	Pennsylvania...	15,200,000
10	Maine.....	14.0	1 64	Mississippi.....	16 61	Tennessee.....	13,130,000
11	Wisconsin.....	14.0	91	New Jersey.....	16 32	Kansas.....	12,700,000
12	Pennsylvania...	13.8	1 29	Michigan.....	15 52	*Missouri*.....	11,160,000
13	Delaware.....	13.5	1 40	Oregon.....	15 31	Kentucky.....	7,960,000
14	Michigan.....	13·5	1 15	Kansas.....	14 79	Virginia.....	6,700,000
15	Arkansas.....	12.3	1 05	Minnesota.....	14 62	New York.....	5,200,000
16	New Jersey.....	12 0	1 36	Maryland.....	13 97	Maryland.....	5,100,000
17	Mississippi.....	11.0	1 51	California.....	12 98	Oregon.....	4,500,000
18	Maryland.....	11.0	1 27	Arkansas.....	12 91	Nebraska.....	3,400,000
19	California.....	11.0	1 18	Wisconsin.....	12 74	.....	.....
20	Illinois.....	10 5	91	South Carolina	11 90	.....	.....
21	Kentucky.....	10 0	1 05	Georgia.....	11 25	.....	.....
22	Nebraska.....	9.8	64	Kentucky.....	10 50	.....	.....
23	Iowa.....	9.7	71	New York.....	10 48	.....	.....
24	Ohio.....	9.5	1 09	Alabama.....	10 45	.....	.....
25	Indiana.....	9.0	97	Ohio.....	10 35	.....	.....
26	*Missouri*.....	9.0	95	Virginia.....	9 68	.....	.....
27	Alabama.....	8.5	1 23	Illinois.....	9 55	.....	.....
28	Tennessee.....	8.5	1 01	W. Virginia....	9 38	.....	.....
29	New York.....	8.0	1 31	North Carolinia	9 30	.....	.....
30	Virginia.....	8.0	1 21	Indiana.....	8 73	.....	.....
31	Georgia.....	7.5	1 50	Tennessee.....	8 58	.....	.....
32	North Carolina.	7.5	1 24	*Missouri*.....	8 55	.....	.....
33	South Carolina	7.0	1 70	Iowa.....	6 88	.....	.....
34	W. Virginia.....	6.8	1 38	Nebraska.....	6 27	.....	.....

In the value per acre of corn *Missouri* stands No. 27; in the value per acre of all aid products No. 28.

Missouri produces 3.82 per cent. of all the wheat grown in the United States, anding No. 12 in the list of wheat-producing States.

19. 1874.

	States.	Per acre bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Oregon	19.5	$ 68	Connecticut	$25 74	Iowa	33,908,000
2	Nevada Ter.	19.0	1 12	New Hampshire	24 80	Illinois	30,122,000
3	Connecticut	18.0	1 45	Vermont	24 31	California	28,380,000
4	Vermont	17 0	1 43	Maine	23 10	Ohio	25,993,000
5	New Hampshire	16.0	1 55	Nevada Ter.	21 22	Indiana	23,331,000
6	New York	15.6	1 26	Massachusetts	21 02	Minnesota	21,338,000
7	New Jersey	15 5	1 30	New Jersey	20 15	Wisconsin	18,436,000
8	Maine	15.0	1 54	New York	19 65	Michigan	17,341,000
9	Ohio	15.0	1 04	Pennsylvania	17 91	Pennsylvania	16,636,000
10	Pennsylvania	14 8	1 21	Texas	16 87	*Missouri*	15,385,000
11	Massachusetts	14.5	1 45	Mississippi	16 10	Tennessee	11,121,000
12	Michigan	14.2	1 08	Arkansas	15 96	Kansas	9,456,000
13	Kansas	13.7	84	Ohio	15 60	New York	9,161,000
14	*Missouri*	13.5	83	Michigan	15 33	Kentucky	8,525,000
15	Minnesota	13.4	70	Delaware	14 41	Virginia	5,672,000
16	California	13.2	99	Oregon	13 26	Maryland	5,209,000
17	Texas	12.5	1 35	Alabama	13 14	Oregon	4,875,000
18	Indiana	12.2	94	California	13 07		
19	W. Virginia	11.6	1 00	Maryland	13 05		
20	Iowa	11.6	65	South Carolina	11 65		
21	Nebraska	11.6	60	W. Virginia	11 60		
22	Illinois	11.5	86	Kansas	11 51		
23	Wisconsin	11.5	83	Indiana	11 47		
24	Delaware	11.0	1 81	*Missouri*	11 20		
25	Maryland	10.7	1 22	Georgia	11 17		
26	Kentucky	10.6	1 00	North Carolina	11 04		
27	Arkansas	10.5	1 52	Kentucky	10 60		
28	Mississippi	9.2	1 75	Minnesota	10 36		
29	Alabama	9.0	1 46	Illinois	9 89		
30	Tennessee	9.0	1 06	Wisconsin	9 54		
31	North Carolina	8.0	1 38	Tennessee	9 54		
32	Virginia	7.8	1 17	Virginia	9 12		
33	Georgia	7.8	1 58	Iowa	7 54		
34	South Carolina	6.3	1 85	Nebraska	6 96		

In the value per acre of corn *Missouri* stands No. 25; in the value per acre of all field products No. 18.

Missouri produces 4.99 per cent. of all the wheat grown in the United States, standing No. 10 in the list of wheat-producing States.

20. 1873.

	States.	Per acre bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Nevada Ter.....	22.6	$1 08	Massachusetts...	$31 54	Iowa.....	34,600,000
2	Massachusetts...	19.0	1 66	Connecticut.....	29 70	Illinois.....	28,417,000
3	Oregon.....	19.0	90	New Hampshire	28 20	Minnesota.....	28,056,000
4	Minnesota.....	18.3	80	New Jersey.....	26 73	Wisconsin.....	26,322,000
5	Connecticut.....	18.0	1 65	Vermont.....	26 72	California.....	21,504,000
6	Texas.....	17 0	1 40	Nevada Ter.....	24 41	Indiana.....	20,832,000
7	Wisconsin.....	16 5	97	Texas.....	23 80	Ohio	18,567,000
8	New Jersey.....	16.2	1 65	New York.....	21 60	Pennsylvania...	15,548,000
9	Vermont.....	16.0	1 67	Pennsylvania...	21 30	Michigan.....	14,214,000
10	Nebraska.....	15.5	75	Maine.....	20 90	*Missouri*.....	11,927,000
11	New Hampshire	15.0	1 88	Delaware.....	18 48	Tennessee.....	7,414,000
12	Pennsylvania...	14.2	1 50	California.....	17 82	Kentucky.....	7,225,000
13	Kansas.....	14.0	1 00	Maryalnd	17 40	New York.....	7,047,000
14	California.....	13.5	1 30	Oregon	17 10	Virginia.....	5,788,000
15	New York.....	13.5	1 60	Mississippi.....	16 80	Maryland.....	5,262,000
16	Illinois.....	13.5	1 10	Michigan.....	16 47	Kansas.....	4,350,000
17	Iowa.....	13.0	79	Wisconsin.....	16 00	.....	.....
18	*Missouri*.....	12.8	1 18	Ohio.....	15 72	.....	.....
19	Michigan.....	12.2	1 35	Arkansas.....	15 00	.....	.....
20	Ohio.....	12.0	1 31	Illinois.....	14 85	.....	.....
21	Maryland.....	11.8	1 54	Minnesota.....	14 64	.....	.....
22	Indiana.....	11.2	1 22	*Missouri*.....	14 46	.....	.....
23	Maine.....	11.0	1 90	Kansas.....	14 00	.....	.....
24	Delaware.....	11.0	1 68	W. Virginia.....	13 78	.....	.....
25	Arkansas.....	10.0	1 50	Indiana.....	13 66	.....	.....
26	Mississippi.....	9 6	1 75	Alabama.....	12 41	.....	.....
27	W. Virginia.....	9·6	1 43	South Carolina.	12 37	.....	.....
28	Kentucky.....	9.0	1 21	Georgia.....	12 25	.....	.....
29	Virginia.....	7.5	1 45	Nebraska.....	11 62	.....	.....
30	Alabama.....	7.3	1 70	Kentucky.....	10 89	.....	.....
31	Tennessee.....	7.2	1 38	Virginia.....	10 37	.....	.....
32	Georgia.....	7.0	1 75	Iowa.....	10 27	.....	.....
33	North Carolina	6.2	1 55	North Carolina	9 61	.....	.....
34	South Carolina	5.5	2 25	Tennessee.....	9 57	.....	.....

In the value per acre of corn *Missouri* stands No. 33; in the value per acre of all field products No. 28.

Missouri produces 4.24 per cent. of all the wheat grown in the United States, standing No. 10 in the list of wheat-producing States.

21. 1872.

	States.	Per acre bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Nevada Ter.	23.7	$1 18	Massachusetts	$33 93	California	25,600,000
2	Texas	18 5	1 65	Maine	30 72	Illinois	24,711,000
3	Oregon	18.2	74	Texas	30 52	Minnesota	23,200,000
4	Massachusetts	17.4	1 95	New Hampshire	30 36	Wisconsin	22,307,000
5	Connecticut	17.0	1 65	Connecticut	28 05	Iowa	22,080,000
6	New Hampshire	16.5	1 84	Vermont	27 84	Indiana	19,381,000
7	Minnesota	16.5	83	Nevada Ter	26 66	Ohio	18,263,000
8	Maine	16.0	1 92	New Jersey	23 35	Michigan	13,986,000
9	Vermont	16.0	1 74	New York	20 62	Pennsylvania	11,603,000
10	Wisconsin	14.3	1 03	Pennsylvania	18 08	Tennessee	10,298,000
11	New Jersey	13.5	1 73	Michigan	17 52	Kentucky	7,854,000
12	Iowa	12.6	85	Ohio	16 61	*Missouri*	7,695,000
13	New York	12.5	1 65	Kansas	16 47	New York	6,712,000
14	Indiana	12 4	1 32	Indiana	16 36	Virginia	6,432,000
15	California	12 2	1 11	Mississippi	16 17	Maryland	3,957,000
16	Nebraska	12.2	78	Arkansas	15 80		
17	Illinois	12.1	1 23	Georgia	15 57		
18	Michigan	12.0	1 46	Kentucky	15 48		
19	Kentucky	12.0	1 29	Illinois	14 88		
20	Ohio	11.7	1 42	Delaware	14 72		
21	Kansas	11.6	1 42	W. Virginia	14 72		
22	Pennsylvania	10.8	1 67	Wisconsin	14 72		
23	Arkansas	10.4	1 52	Maryland	14 28		
24	Mississippi	10 8	1 57	Alabama	14 06		
25	W. Virginia	10 8	1 48	Minnesota	13 69		
26	Tennessee	9 6	1 40	California	13 54		
27	Alabama	9.5	1 48	Oregon	13 46		
28	Delaware	9.2	1 60	Tennessee	13 44		
29	Georgia	9 0	1 73	Virginia	13 10		
30	*Missouri*	8 8	1 41	North Carolina	12 54		
31	Maryland	8.5	1 68	*Missouri*	12 40		
32	Virginia	8.4	1 56	South Carolina	11 46		
33	North Carolina	8 2	1 53	Iowa	10 71		
34	South Carolina	6.1	1 88	Nebraska	9 51		

In the value per acre of corn *Missouri* stands No. 21; in the value per acre of all field products No. 25.

Missouri produces 3.08 per cent. of all the wheat grown in the United States, standing No. 12 in the list of the wheat-producing States.

22. 1871.

States.	Per acre. bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
Nevada Ter.	22.7	$1 29	Massachusetts.	$30 57	Illinois	25,216,000
Oregon	19.2	1 04	Nevada Ter.	29 47	Pennsylvania	19,339,000
Massachusetts.	18 2	1 68	New Jersey	27 72	Indiana	19,190,000
New Jersey	18.0	1 54	Vermont	26 89	Ohio	18,575,000
New York	17.2	1 51	Connecticut	26 35	Wisconsin	18,436,000
Connecticut	17.0	1 55	N. Hampshire	26 14	Iowa	18,400,000
Vermont	16.6	1 62	New York	25 97	California	16,757,000
Pennsylvania	16.2	1 45	Pennsylvania	23 49	Michigan	16,205,000
Kansas	15.9	1 13	Maine	23 40	*Missouri*	12,825,000
N. Hampshire	15.2	1 72	Texas	22 65	Minnesota	12,016,000
Michigan	14.0	1 32	Oregon	19 96	New York	9,589,000
Ohio	13.9	1 26	Michigan	18 48	Virginia	6,369,000
Missouri	13.4	1 16	Maryland	18 24	Maryland	5,654,000
Maine	13.0	1 80	Kansas	17 96	Tennessee	5,149,000
Illinois	12 8	1 18	Ohio	17 51	Kentucky	4,888,000
Wisconsin	12 2	1 11	Delaware	17 48		
Maryland	12.0	1 52	Mississippi	15 90		
Indiana	12 0	1 26	*Missouri*	15 54		
Texas	11.5	1 97	California	15 51		
Delaware	11.5	1 52	Indiana	15 12		
California	11.0	1 41	Illinois	14 51		
Minnesota	11.0	1 00	Wisconsin	13 54		
Iowa	10 3	96	West Virginia	13 10		
Nebraska	10.3	90	Arkansas	13 02		
Mississippi	10.0	1 59	Virginia	11 12		
West Virginia	10.0	1 31	Minnesota	11 00		
Arkansas	8.4	1 55	Iowa	10 36		
Virginia	8.0	1 39	South Carolina	10 15		
Alabama	6.3	1 56	Alabama	9 82		
Kentucky	6.1	1 29	Nebraska	9 27		
North Carolina	6 0	1 42	North Carolina	8 52		
South Carolina	5.0	2 03	Georgia	8 30		
Georgia	5 0	1 66	Kentucky	7 86		
Tennessee	5.0	1 28	Tennessee	6 40		

In the value per acre of corn *Missouri* stands No. 26; in the value per acre of all field products, No. 23.

Missouri produces 5.56 per cent. of all the wheat grown in the United States, standing No. 9 in the list of the wheat-producing States.

23. 1870.

	States.	Per acre. bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Nevada Ter.....	25.4	$1 25	Nevada Ter.....	$31 68	Illinois.....	27,115,000
2	Oregon.....	19.5	95	Massachusetts..	30 80	Wisconsin.....	20,485,000
3	California.....	19.0	1 10	Vermont	27 88	Iowa.....	20,445,000
4	Connecticut.....	17.8	1 52	Connecticut.....	27 05	Indiana.....	20,200,000
5	Massachusetts...	17.6	1 75	Maine.....	26 34	Ohio.....	19,150,000
6	Vermont.....	16.8	1 63	N. Hampshire ..	23 53	Pensylvania.....	17,115,000
7	Minnesota.....	15.2	83	California.....	20 90	Minnesota.....	16,022,000
8	Kansas.....	15.0	86	Texas.....	20 24	Michigan.....	15,288,000
9	Maine.....	14.8	1 78	New York	19 45	California.....	14,175,000
10	N. Hampshire...	14.8	1 59	Oregon.....	18 52	New York.....	9,133,000
11	Nebraska.....	14.4	64	New Jersey.....	18 30	Tennessee.....	7,357,000
12	Michigan	14.0	1 08	Pennsylvania ...	15 24	*Missouri*.....	6,750,000
13	New York.....	13.8	1 41	Michigan.....	15 12	Virginia.....	6,705,000
14	Ohio.....	13.8	1 09	Ohio.....	15 04	Kentucky.....	5,610,000
15	Wisconsin.....	13.4	90	Mississippi.....	14 74	Maryland.....	4,792,000
16	*Missouri*.....	13.0	91	Arkansas.....	14 04	.....	.....
17	New Jersey.....	12.8	1 43	West Virginia..	13 90	.....	.....
18	Iowa.....	12.5	78	South Carolina	13 28	.....	.....
19	Pennsylvania....	12.0	1 27	Kansas.....	12 90	.....	.....
20	Illinois.....	12.0	94	Minnesota.....	12 61	.....	.....
21	Texas.....	11.7	1 78	Delaware.....	12 50	.....	.....
22	West Virginia..	11.4	1 22	Maryland.....	12 41	.....	.....
23	Indiana.....	11 0	1 00	Wisconsin.....	12 06	.....	.....
24	Hrkansas	10.8	1 30	Virginia.....	11 90	.....	.....
25	Delaware.....	10.0	1 25	*Missouri*.....	11 83	.....	.....
26	Kentucky.....	10.0	1 00	Georgia.....	11 76	.....	.....
27	Maryland.....	9.7	1 28	Illinois.....	11 28	.....	.....
28	Mississippi.....	9.7	1 52	Indiana.....	11 00	.....	.....
29	Virginia.....	9.6	1 24	Alabama.....	10 75	.....	.....
30	Tennessee	8.8	97	North Carolina.	10 40	.....	.....
31	North Carolina.	8.6	1 21	Kentucky.....	10 00	.....	.....
32	Alabama.....	8.4	1 28	Iowa.....	9 75	.....	.....
33	Georgia.....	8.0	1 47	Nebraska.....	9 21	.....	.....
34	South Carolina.	7.0	1 89	Tennessee.....	8 52	.....	.....

COMPENDIUM OF THE NINTH CENSUS, PAGE 694, AS FOLLOWS:

	States.	Bushels produced.
1	Illinois	80,128,405
2	Iowa	29,435,692
3	Ohio	27,882,159
4	Indiana	27,747,222
5	Wisconsin	25,606,344
6	Pennsylvania	19,672,967
7	Minnesota	18,866,073
8	California	16,676,702
9	Michigan	16,265,773
10	Missouri	14,315,926
11	New York	12,178,462
12	Virginia	7,398,787
13	Tennessee	6,188,916
14	Maryland	5,774,503
15	Kentucky	5,728,704

In the value per acre of corn *Missouri* stands No. 25; in the value per acre of all ld products, No. 23.

Missouri produces 2.86 per cent. of all the wheat grown in the United States, nding No. 12 in the list of the wheat-producing States.

24. 1869.

	States.	Per acre bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Nevada Ter	25.0	$1 50	Nevada Ter.	$37 50	Illinois	29,200,000
2	Oregon	19.0	85	N. Hampshire	32 37	Wisconsin	24,000,000
3	Kansas	18.5	79	Massachusetts	31 50	Iowa	23,500,000
4	California	18.2	93	Vermont	28 26	Indiana	20,600,000
5	Vermont	18.0	1 57	Maine	28 18	Ohio	24,400,000
6	Massachusetts	18.0	1 75	Connecticut	24 50	California	20,000,000
7	Nebraska	17.8	51	New Jersey	22 11	Minnesota	19,000,000
8	N. Hampshire	17.5	1 86	New York	21 92	Michigan	16,800,000
9	Connecticut	17 5	1 40	Pennsylvania	18 94	Pennsylvania	16,500,000
10	New Jersey	16.5	1 34	Texas	18 87	New York	9,750,000
11	Minnesota	16.3	1 59	Arkansas	17 81	Virginia	8,642,000
12	New York	16.0	1 37	Delaware	17 28	*Missouri*	7,500,000
13	Ohio	15.5	1 03	California	16 92	Tennessee	6,750,000
14	Maine	15.4	1 83	Oregon	16 15	Maryland	6,733,000
15	Wisconsin	15.3	68	Ohio	15 96		
16	Michigan	15.2	97	Mississippi	15 75		
17	Pennsylvania	14 8	1 28	Maryland	15 34		
18	Indiana	14.4	98	Michigan	14 74		
19	*Missouri*	14.1	80	West Virginia	14 74		
20	Delaware	13.5	1 28	Kansas	14 61		
21	Iowa	13.0	52	South Carolina	13 79		
22	Maryland	11.8	1 80	Indiana	13 89		
23	Arkansas	11.8	1 51	North Carolina	12 85		
24	West Virginia	11.7	1 26	Virginia	12 70		
25	Illinois	11.2	76	Alabama	12 63		
26	Texas	11 1	1 70	Georgia	12 21		
27	Kentucky	11.0	1 10	Kentucky	12 10		
28	Virginia	10.5	1 21	*Missouri*	11 28		
29	Mississippi	9.0	1 75	Wisconsin	10 40		
30	North Carolina	8.4	1 53	Tennessee	9 66		
31	Tennessee	8.4	1 15	Minnesota	9 61		
32	Alabama	7.8	1 62	Nebraska	9 07		
33	Georgia	7 4	1 65	Illinois	8 51		
34	South Carolina	6.6	2 09	Iowa	6 76		

In the value per acre of corn *Missouri* stands No. 19; in the value per acre of all field products No. 18.

Missouri produces 2.88 per cent. of all the wheat grown in the United States, standing No. 12 in the list of the wheat-producing States.

25. 1868.

	States.	Per acre bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	California	20.0	$1 03	Massachusetts	$37 20	Illinois	28,560,000
2	Vermont	16.0	2 26	Vermont	36 16	Winconsin	22,660,000
3	Kansas	15.6	1 35	Connecticut	31 00	California	21,000,000
4	Nebraska	15.5	96	New York	30 86	Iowa	20,300,000
5	Massachusetts	15.5	2 40	New Jersey	29 32	Indiana	17,866,000
6	Connecticut	15 5	2 00	N. Hampshire	28 81	Ohio	17,050,000
7	Minnesota	15.0	83	Arkansas	27 00	Michigan	16,012,000
8	New York	14.6	2 08	Pennsyvania	25 84	Pennsylvania	15,300,000
9	Iowa	14.5	95	Maine	24 00	Minnesota	14,500,000
10	*Missouri*	14.0	1 49	Delaware	22 80	New York	8,497,000
11	New Jersey	13 9	2 11	Ohio	21 45	Virginia	6,914,000
12	Arkansas	13.5	2 00	Maryland	21 31	Tennessee	6,137,000
13	Ohio	13.0	1 65	Kansas	21 06	Maryland	5,706,000
14	Wisconsin	13.0	1 00	*Missouri*	20 86	*Missouri*	5,357,000
15	Pennsylvania	12.8	1 98	California	20 60		
16	Michigan	12.5	1 64	Michigan	20 50		
17	Delaware	12.0	1 90	West Virginia	20 11		
18	N. Hampshire	11.7	2 42	Mississippi	19 92		
19	Illinois	11.5	1 20	Indiana	16 80		
20	Indiana	11.2	1 50	Virginia	15 96		
21	West Virginia	10.7	1 88	Kentucky	15 81		
22	Maryland	10.2	2 09	Nebraska	14 88		
23	Maine	10.0	2 40	Illinois	13 80		
24	Mississippi	9 1	2 19	Iowa	13 77		
25	Kentucky	8.5	1 86	Texas	13 50		
26	Virginia	8.4	1 90	Wisconsin	13 00		
27	Tennessee	6.6	1 88	South Carolina.	12 60		
28	Alabama	6.1	1 98	Minnesota	12 45		
29	Texas	6 0	2 25	Tennessee.	12 40		
30	North Carolina.	5.9	2 00	Georgia.	12 82		
31	South Carolina.	5 6	2 25	Alabama	12 07		
32	Georgia	5.6	2 20	North Carolina.	11 80		

In the value per acre of corn *Missouri* stands No. 20; in the value per acre of all field products No. 16.

Missouri produces 2.89 per cent. of all the wheat grown in the United States, standing No. 14 in the list of wheat-producing States.

26. 1867.

	States.	Per acre. bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Connecticut	17.5	$2 63	Connecticut	$46 02	Illinois	28,000,000
2	Pacif. St. T.	16.6	1 10	Massachusetts	44 96	Wisconsin	22,000,000
3	Massachusetts	16 0	2 81	Vermont	43 60	Pacif. St. T	20,000,000
4	Vermont	15.8	2 76	New York	38 28	Ohio	18,000,000
5	Nebraska	15.0	1 82	New Jersey	36 12	Indiana	16,861,000
6	New York	14.5	2 64	New Hampshire	34 96	Iowa	16,300,000
7	New Jersey	14.0	2 58	Pennsylvania	30 37	Michigan	15,350,000
8	Kansas	14.0	1 84	Maine	29 57	Pennsylvania	15,000,000
9	Iowa	12.7	1 43	Michigan	29 01	Minnesota	10,000,000
10	Minnesota	12 5	1 48	Ohio	27 37	New York	8,250,000
11	Pennsylvania	12.5	2 43	Maryland	26 73	Virginia	6,718,000
12	*Missouri*	12.4	2 00	Kansas	25 76	Tennessee	6,017,000
13	Michigan	12.4	1 84	West Virginia	25 09	Maryland	5,435,000
14	Wisconsin	12.3	1 77	*Missouri*	24 80	*Missouri*	4,961,000
15	New Hampshire	12.1	2 89	Indiana	23 20		
16	Ohio	11.6	2 86	Mississippi	22 80		
17	Illinois	11.4	1 97	Illinois	22 45		
18	Maryland	11.0	2 43	Delaware	22 13		
19	Maine	10.6	2 79	Wisconsin	21 77		
20	West Virginia	10.5	2 89	Nebraska	19 80		
21	Indiana	10 5	2 21	Georgia	18 80		
22	Mississippi	9.5	2 40	Minnesota	18 50		
23	Texas	9 5	1 89	Arkansas	18 49		
24	Delaware	9.3	2 38	Pacif. St. T	18 26		
25	Arkansas	9 2	2 01	Iowa	18 16		
26	Tennessee	8 5	2 11	Texas	17 95		
27	Kentucky	8.2	2 17	Tennessee	17 93		
28	Georgia	8.0	2 35	Kentucky	17 79		
29	Virginia	8 0	2 12	Virginia	16 96		
30	Alabama	7.8	2 05	Alabama	15 99		
31	North Carolina.	6.9	2 11	South Carolina.	15 23		
32	South Carolina.	6.4	2 88	North Carolina.	14 55		

In the value per acre of corn *Missouri* stands No. 22; in the value per acre of all field products No. 18.

Missouri produces 2.84 pe cent. of all the wheat grown in the United States, standing No. 14 in the list of wheat-producing States.

27. 1866.

	States.	Per acre, bushels.	Per bush.	States.	Per acre.	States.	Bushels produced
1	Nebraska	26.0	$1 28	Vermont	$53 93	Illinois	28,551,421
2	Kansas	21.4	1 91	Connecticut	48 95	Wisconsin	20,307,920
3	Vermont	20.2	2 67	New Hampshire	41 79	Iowa	15,753,323
4	Connecticut	17.3	2 83	Massachusetts	41 42	Michigan	14,740,639
5	*Missouri*	16.5	2 01	Kansas	40 87	New York	12,556,406
6	New Hampshire	16.2	2 58	New York	40 58	Pennsylvania	10,519,660
7	Iowa	16.0	1 42	New Jersey	39 55	Ohio	10,208,854
8	New York	15.2	2 67	Maine	36 82	Indiana	9,114,562
9	Massachusetts	14.9	2 78	Michigan	35 19	Maryland	4,383,708
10	Wisconsin	14.5	1 67	*Missouri*	33 16	Virginia	4,331,364
11	Michigan	13 8	2 55	Nebraska	31 98	Tennessee	3,585,262
12	New Jersey	13 5	2 93	Pennsylvania	29 87	*Missouri*	3,544,036
13	Illinois	13.0	1 93	Maryland	28 51		
14	Main	12 7	2 86	Illinois	25 09		
15	Texas	12 0	1 45	Wisconsin	24 21		
16	Pennsylvania	11.0	2 67	Delaware	24 00		
17	Maryland	9.7	2 94	Iowa	22 72		
18	Delaware	8.0	3 00	Virginia	19 09		
19	Virginia	6.7	2 85	Texas	17 40		
20	Kentucky	6.5	2 30	North Carolina	15 77		
21	Arkansas	6.5	2 06	South Carolina	14 99		
22	Indiana	5.9	2 41	Kentucky	14 91		
23	North Carolina	5.8	2 72	Indiana	14 21		
24	Alabama	5 7	2 34	Arkansas	13 39		
25	Tennessee	5.3	2 21	Alabama	13 33		
26	Mississippi	5.0	2 58	Mississippi	12 65		
27	South Carolina	4 7	3 19	Tennessee	11 71		
28	Ohio	4.5	2 52	Ohio	11 34		
29	Georgia	4.0	2 72	Georgia	10 88		

In the value per acre of corn *Missouri* stands No. 18; in the value per acre of all field products No. 15.

Missouri produces 2.38 per cent. of all the wheat grown in the United States, standing No. 12 in the list of the wheat-producing States.

28. 1865.

	States.	Per acre, bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Minnesota	20.6	$ 80	Connecticut	$41 56	Illinois	25,266,745
2	Vermont	18.3	2 18	New Hampshire	39 74	Wisconsin	20,307,9[illegible]
3	Nebraska, Ter.	18.0	1 49	Vermont	39 50	Ohio	17,601,47[illegible]
4	Massachusetts.	17.6	2 21	Massachusetts	38 99	Michigan	16,378,48[illegible]
5	Connecticut	17.5	2 37	New York	31 96	Iowa	13,698,54[illegible]
6	Wisconsin	16.8	1 09	New Jersey	28 86	Indiana	13,020,80[illegible]
7	Michigan	15.7	1 65	Maine	28 80	New York	12,556,40[illegible]
8	New Hampshire	15.8	2 60	Kansas	26 90	Pennsylvania	11,688,511
9	New York	15 3	2 08	Nebraska Ter.	26 82	Maryland	5,479,635
10	Kansas	15.2	1 77	Michigan	25 85	Minnesota	3,425,4[illegible]
11	Iowa	14.6	1 00	Pennsylvania	25 09	*Missouri*	2,953,[illegible]63
12	Maine	13.0	2 21	*Missouri*	20 73	Kentucky	2,788,184
13	*Missouri*	12.7	1 63	Maryland	19 52		
14	New Jersey	12.4	2 83	Wisconsin	18 81		
15	Pennsylvania	12 2	2 06	Minnesota	16 48		
16	Illinois	11.0	1 09	Ohio	15 17		
17	Maryland	9 5	2 06	Delaware	15 00		
18	Ohio	8.5	1 60	Iowa	14 63		
19	Indiana	8.5	1 35	Kentucky	12 86		
20	Delaware	7.5	2 00	Illinois	11 99		
21	Kentucky	7.2	1 70	Indiana	11 51		

In the value per acre of corn *Missouri* stands No. 13; in the value per acre of all field products, No. 9.

Missouri produces 1.99 per cent. of all the wheat grown in the United States, standing No. 11 in the list of wheat-producing States.

29. 1864.

	States.	Per acre, bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Connecticut.....	16.5	$2 37	Connecticut.....	$39 19	Illinois.....	33,371,178
2	Massachusetts..	16.0	2 41	Massachusetts..	38 56	Indiana.....	22,321,376
3	New Jersey.....	15.0	2 33	Vermont	36 05	Ohio.....	20,407,503
4	Kansas.....	15.0	2 01	New Jersey.....	34 95	Wiscorsin.....	14,168,817
5	*Missouri*.....	14.6	1 75	New Hampshire	33 50	Michigan.....	13,966,153
6	Illinois.....	14.3	1 75	New York..	30 50	Iowa.....	12,649,807
7	Vermont.....	14.0	2 57	Delaware.....	30 36	Pennsylvania...	12,523,404
8	Indiana.....	14.0	1 75	Kansas.....	30 15	New York.....	10,918,615
9	Nebraska.....	14.0	1 50	Maryland	29 90	Maryland.....	6,487,946
10	Minnesota	13.3	1 14	Pennsylvania...	28 80	Kentucky..	3,882,275
11	New York.....	13.0	2 35	Maine.	27 18	*Missouri*.....	3,281,514
12	New Hampshire	12.5	2 68	*Missouri*.....	24 85	.....	.....
13	Iowa.....	12 2	1 34	Indiana...	24 50	.....	.....
14	Michigan	12.0	1 96	Michigan.....	23 52	.....	.....
15	Delaware..... ...	12.0	2 53	Illinois.....	22 21	.....	.....
16	Pennsylvania...	12 0	2 40	Nebra-ka.....	21 00	.....	.....
17	Maryland.....	11.5	2 60	Kentucky.....	20 14	.....	.....
18	Maine..	10.5	2 60	Ohio.....	19 78	.....	.....
19	Kentucky.....	10.3	1 96	West Virginia..	18 69	.....	.....
20	Ohio.....	10.3	1 93	Iowa.....	16 48	.....	.....
21	Wisconsin.....	9.5	1 48	Minnesota	15 15	.....	.....
22	West Virginia..	9.3	2 01	Wisconsin.....	14 09	.....	.....

In the value per acre of corn *Missouri* stands No. 18; in the value of all field products, No. 12.

***Missouri* produces 2.04 per cent. of all the wheat grown in the United States, tanding No. 11 in the list of the wheat-producing States.**

30. 1863.

	States.	Per acre bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	Delaware	18.0	$1 60	Delaware	$28 80	Illinois	31,408,162
2	New Jersey	16.0	1 58	Massachusetts	27 16	Ohio	28,742,963
3	*Missouri*	16 0	1 02	N. Hampshire	26 88	Wisconsin	20,842,359
4	Kansas	16 0	88	Connecticut	24 48	Indiana	20,292,160
5	Connecticut	15.0	1 67	New Jersey	24 48	Pennsylvania	15,654,255
6	Massachusetts	14.0	1 94	Maine	21 12	Michigan	13,966,155
7	N. Hampshire	14.0	1 92	Pennsyvania	19 88	New York	13,021,650
8	Pennsylvania	14.0	1 42	New York	19 46	Iowa	12,649,807
9	New York	14.0	1 39	Vermont	18 96	California	11,664,203
10	Indiana	14.0	1 08	Maryland	18 04	Maryland	7,208,823
11	Wisconsin	14.0	92	Michigan	17 03	Kentucky	6,546,106
12	Iowa	14 0	76	*Missouri*	16 82	*Missouri*	2,858,621
13	Minnesota	14.0	70	Indiana	15 12		
14	Michigan	13.0	1 81	Ohio	14 69		
15	Ohio	13.0	1 13	Kansas	14 08		
16	Maine	12.0	1 76	Wisconsin	12 88		
17	Vermont	12.0	1 58	Illinois	12 60		
18	Illinois	12.0	1 05	Iowa	10 64		
19	Maryland	11 0	1 64	Minnesota	9 80		

In the value per acre of corn *Missouri* stands No. 15; in the value per acre of all field products No. 11.

Missouri produces 1.64 per cent. of all the wheat grown in the United States, standing No. 14 in the list of wheat-producing States.

31. 1862.

	States.	Per acre bushels.	Per bush.	States.	Per acre.	States.	Bushels produced.
1	California	24.3	$1 03	Massachusetts	$27 86	Illinois	32,213,500
2	Kansas	21.0	74	California	25 03	Ohio	30,796,032
3	Minnesota	20 0	56	Maine	24 80	Wisconsin	20,765,781
4	New Jersey	19 0	1 30	New Jersey	24 70	Indiana	20,292,160
5	New York	18.0	1 25	Connecticut	24 48	Pennsylvania	15,654,255
6	Pennsylvania	18.0	1 22	N. Hampshire	22 95	Michigan	14,963,785
7	Michigan	18.0	1 00	New York	22 50	New York	13,021,650
8	Massachusetts	17.0	1 61	Pennsylvania	21 96	Iowa	10,541,506
9	Connecticut	17.0	1 44	Vermont	21 60	California	8,805,411
10	Wisconsin	17.0	78	Maryland	19 46	Maryland	6,553,480
11	*Missouri*	17.0	77	Michigan	18 00	*Missouri*	5,636,781
12	Maine	16.0	1 55	Delaware	16 80		
13	Vermont	16.0	1 35	Kansas	15 54		
14	Ohio	16.0	96	Ohio	15 36		
15	Indiana	16.0	88	Indiana	14 08		
16	N. Hampshire	15.0	1 53	Wisconsin	13 26		
17	Delaware	15.0	1 12	*Missouri*	13 09		
18	Maryland	14 0	1 39	Minnesota	11 20		
19	Illinois	14 0	76	Illinois	10 64		
20	Iowa	14 0	69	Iowa	9 66		

In the value per acre of corn *Missouri* stands No. 19; in the value per acre of all field products No. 18.

Missouri produces 3.17 per cent. of all the wheat grown in the United States, standing No. 11 in the list of the wheat-producing States.

32. RECAPITULATION FOR MISSOURI.

	Production of wheat.	Area in wheat.	Value of wheat.	Yield per acre.	Price per bushel.	Value per acre.
	Bushels.	Acres.	Dollars.	Bushels.	Dollars.	Dollars.
1880	30,688,000	2,192,000	27,312,320	14.0	89	12 46
1879	26,801,600	1,914,400	27,069,616	14.0	1 01	14 14
1878	20,196,000	1,886,000	13,531,320	11.0	67	7 73
1877	20,000,000	1,428,571	20,000,000	14.0	1 00	14 00
1876	15,240,000	1,229,062	12,568,600	12 4	89	11 03
1875	11,160,000	1,240,000	10,602,000	9.0	95	8 55
1874	15,385,000	1,189,629	12,769,550	13.5	83	11 2[illegible]
1873	11,927,000	931,797	13,477,510	12 8	1 13	14 4[illegible]
1872	7,695,000	874,431	10,849,950	8 8	1 41	12 4[illegible]
1871	12,825,090	957,089	14,877,000	13.4	1 16	15 5[illegible]
1870	6,750,000	519,280	6,142,500	13.0	91	11 8[illegible]
1869	7,500,000	531,914	6,000,000	14 1	80	11 2[illegible]
1868	5,857,000	382,642	7,981,980	14.0	1 49	20 8[illegible]
1867	4,961,000	400,080	9,922,000	12.4	2 00	24 8[illegible]
1866	3,544,086	214,790	7,128,512	16 5	2 01	33 1[illegible]
1865	2,958,863	231,636	4,824,336	12.7	1 63	20 7[illegible]
1864	8,281,514	231,092	5,742,648	14.6	1 75	24 8[illegible]
1863	2,858,621	178,351	2,910,698	16.0	1 02	16 3[illegible]
1862	5,636,781	331,575	4,840,321	17.0	77	13 0[illegible]

NOTE.—The cost of production per acre of wheat, including interest on purchase money of land and farm implements, keeping up fences, paying taxes and delivering grain to railroad station, is variously estimated at from 8 to 10 dollars; the less densely populated Western States produce it at less cost than the Eastern States with their high-priced lands; this difference, however, is partially equalized by greater productiveness and shorter distances to the great centers of trade; in Missouri the cost of production is about 8 dollars per acre.

A.

33. RECAPITULATION FOR MISSOURI BY COUNTIES, GIVING THE POPULATION AND WHEAT PRODUCTION FROM THE RETURNS OF THE UNITED STATES CENSUS.

	Population—Census, United States.			Wheat Production—1880—1870.			
Counties.	1880.	1870.	1860.	Bushels.	Acres.	B. P. A.	Bushels
Adair	15,190	11,448	8,531	37,105	2,768	13.4	46,981
Andrew	16,318	15,137	11,850	291,717	29,603	9.9	107,325
Atchison	14,565	8,440	4,649	329,810	25,855	12.8	45,117
Audrain	19,760	12,307	8,075	76,314	5,470	14.0	44,545
Barry	14,484	10,378	7,995	172,693	19,432	8.9	71,669
Barton	10,332	5,087	1,817	148,648	18,174	10.9	21,486
Bates	25,382	15,960	7,215	277,703	23,824	11.2	104,533
Benton	12,398	11,322	9,072	120,733	18,067	9.2	122,852
Bollinger	11,132	8,162	7,371	135,335	17,862	7 6	51,286
Boone	25,444	20,765	19,486	337,021	27,903	12.1	235,750
Buchanan	49,820	85,109	28,861	443,178	38,828	11.4	239,874
Butler	6,011	4,298	2,891	10,925	1,604	6.8	10,994
Caldwell	18,654	11,390	5,034	38,417	5,339	7.2	104,130
Callaway	23,670	19,202	17,449	234,236	21,232	11.0	167,545
Camden	7,267	6,108	4,975	69,171	7,972	8 7	43,010
Cape Girardeau	20,998	17,558	15,547	535,893	45,736	11.7	260,445
Carroll	23,262	17,446	9,763	309,628	25,960	11.9	233,069
Carter	2,168	1,455	1,235	6,546	874	7.5	4,992
Cass	22,481	19,296	9,794	519,526	37,919	13.7	205,789
Cedar	10,757	9,474	6,637	96,031	10,337	9 3	59,377
Chariton	25,224	19,136	12,562	229,061	17,308	13 3	205,851
Christian	9,649	6,707	5,491	145,513	14,804	9.8	56,574
Clark	15,031	13,667	11,684	97,253	6,932	14.0	90,159
Clay	15,579	15,564	13,023	257,887	22,443	11.5	197,214
Clinton	16,073	14,063	7,848	121,598	10,859	11 2	93,770
Cole	15,519	10,292	9,697	288,193	24,744	11.7	115,299
Cooper	21,688	20,692	17,356	516,188	40,374	12 8	385,696
Crawford	10,774	7,982	5,823	121,496	12,762	9.5	64,530
Dade	12,557	8,683	7,072	110,157	11,055	10 0	78,016
Dallas	9,272	8,388	5,892	82,696	10,368	7.9	57,659
Daviess	19,174	14,410	9,606	161,874	17,268	9.4	85,362
DeKalb	13,344	9,858	5,224	167,084	11,128	15 0	46,646
Dent	10,647	6,357	5,654	99,319	11,185	8.9	55,024
Douglas	7,753	3,915	2,414	41,236	5,783	7.1	13,794
Dunklin	9,604	5,982	5,026	24,160	2,905	8.3	5,267
Franklin	26,536	80,098	18,085	796,726	58,685	13.6	586,921
Gasconade	11,178	10,093	8,727	348,224	27,625	12.4	222,850
Gentry	17,202	11,617	11,980	103,466	10,357	10.0	61,965

B.

County.	Population—Census, United States.			Wheat Production, 1880—1870.			
	1880.	1870.	1860.	Bushels.	Acres	B. P. A.	Bushels.
Greene	28,839	21,549	18,186	553,670	48,199	11.5	171,164
Grundy	15,210	10,567	7,887	188,440	10,329	18.4	63,242
Harrison	20,318	14,635	10,626	147,278	12,055	12.2	109,571
Henry	28,843	17,401	9,866	191,457	17,982	10.7	239,822
Hickory	7,398	6,452	4,705	68,944	7,495	9.2	43,696
Holt	15,510	11,652	6,550	297,907	28,955	12 4	71,421
Howard	18,428	17,238	15,946	308,934	27,945	11.1	400,410
Howell	8,814	4,218	3,169	37,667	5.441	6.9	15,356
Iron	8,188	6,278	5,242	49,521	5,526	8.9	12,221
Jackson	82,364	55,041	22,913	449,335	34,115	13 2	312,084
Jasper	32,021	14,926	6,883	501,567	39,840	12.6	87,658
Jefferson	18,786	15,380	10,344	428,888	33,174	12.8	149,298
Johnson	28,177	24,648	14,644	791,674	56,614	13.9	462,990
Knox	13,047	10,974	8,727	49,258	8,556	13.9	68,745
Laclede	11,524	9,380	5,182	128,152	15,182	8.5	66,998
Lafayette	25,750	22,628	20,098	857,668	71,450	12 0	421,567
Lawrence	17,585	13,067	8,846	305,173	28,208	10.8	185,838
Lewis	15,925	15,114	12,286	143,126	10,696	13.4	152,454
Lincoln	17,443	15,960	14,210	424,119	37,413	11.3	329,479
Linn	20,016	15,900	9,112	96,776	6,650	14.5	108,711
Livingston	20,305	16,730	7,417	206,330	18,079	11.4	141,657
McDonald	7,816	5,226	4,088	95,309	9,135	10 4	34,160
Macon	26,223	23,280	14,346	64,270	5,108	12.6	110,156
Madison	8,860	5,849	5,664	78,691	9,153	8.0	11,431
Maries	7,328	5,916	4,901	106,132	11,222	9.4	79,243
Marion	24,837	23,780	18,888	353,617	22,258	11.9	230,622
Mercer	14,674	11,557	9,300	82,653	6,885	12.0	69,068
Miller	9,807	6,616	6,812	150,092	14,589	10.3	91,918
Mississippi	9,270	4,982	4,859	110,448	8,276	13.4	5,225
Moniteau	14,849	11,375	10,124	222,339	22,140	10.0	204,589
Monroe	19,075	17,149	14,785	132,705	10,716	12.4	104,066
Montgomery	16,251	10,405	9,718	193,085	15,507	12.5	74,150
Morgan	10,134	8,434	8,202	79,281	9,019	8.8	83,123
New Madrid	7,694	6,357	5,654	49,273	4,326	11.4	8,990
Newton	18,948	12,821	9,319	231,484	21,947	10.5	67,735
Nodaway	29,560	14,751	5,252	374,085	33,290	11.2	46,824
Oregon	5,791	3,287	3,009	16,295	2,053	7 9	15,363
Osage	11,824	10,793	7,879	336,879	27,850	12.3	222,173

C.

	Population—Census, United States.			Wheat Production, 1880—1870.			
County.	1880.	1870.	1860.	Bushels.	Acres.	B. P. A	Bushels.
Ozark	5,618	3,363	2,447	13,008	2,183	6.1	9,578
Pemiscot	4,299	2,059	2,962	3,020	208	14.5	170
Perry	11,895	9,877	9,128	472,435	36,148	13 1	230,674
Pettis	27,298	18,706	9,392	268,748	22,977	11.8	270,245
Phelps	12,565	10,506	5,714	144,442	15,795	9.2	70,187
Pike	26,716	23,076	18,417	669,523	45,260	14 8	438,009
Platte	17,373	17,352	18,350	600,654	45,604	13.2	196,060
Polk	15,745	12,445	9,995	148,840	18,348	8 1	117,999
Pulaski	7,250	4,714	3,835	57,573	7,590	7.6	28,087
Putnam	13,556	11,217	9,207	82,886	3,184	10.3	62,808
Ralls	11,888	10,510	8,592	855,056	22,394	15.9	158,728
Randolph	22,751	15,908	11,407	70,724	6,116	11.6	82,508
Ray	20,200	18,700	14,092	181,646	17,651	10 3	187,736
Reynolds	5,722	3,756	3,178	33,033	4,310	7.7	18,382
Ripley	5,377	3,175	3,747	12,196	1,745	7.0	17,725
St. Charles	23,060	21,304	16,523	1,124,518	61,099	18.4	760,980
St. Clair	14.157	6,742	6,812	121,961	13,207	9.2	35,060
St. Francois	13,821	9,742	7,249	163,350	16,116	10.1	63,632
Ste. Genevieve	10,390	8,384	8,029	387,892	27,019	12.5	155,228
St. Louis city	350,522	org.	....	11,295	469	24.0	.....
St. Louis	31,888	351,189	190,524	908,838	47,883	18.9	450,026
Saline	29,988	21,672	14,699	853,505	60,152	14.3	396,645
Schuyler	10,470	8,820	6,697	88,058	8,098	12.3	49,727
Scotland	12,507	10,670	8,873	69,725	5,718	12.2	95,862
Scott	8,587	7,317	5,247	200,376	16,227	12.3	77,020
Shannon	3,441	2,339	2,284	13,107	1,782	7.6	7,248
Shelby	14,024	10,119	7,801	61.045	4,782	12.7	41,258
Stoddard	18,432	8,535	7,877	97,811	11,875	8.2	34,501
Stone	4,429	3,253	2,400	38,264	3,737	10 2	13,022
Sullivan	16,569	11,907	9,108	50,933	3,705	13.7	61,467
Taney	5,633	4,407	3,576	19,943	3,196	6.2	6,875
Texas	12,219	9,618	6,067	84,661	10,970	7.7	51,778
Vernon	19,382	11,247	4,850	240,370	22,265	10.8	56,934
Warren	10,806	9,673	8,889	806,925	28,465	15.6	252,187
Washington	12,895	11,719	9,723	118,894	12,620	9.4	88,627
Wayne	9,097	6,068	5,629	52,562	6,619	7.9	23,819
Webster	12,176	10,484	7,099	120,064	15,665	7.7	73,581
Worth	8,208	5,004	org.1861	60,783	6,199	9 8	29,576
Wright	9,733	5,684	4,508	68.296	8,952	7.6	42,316

Note.—The average yield per acre of the State from the above returns is 10.1 bushels, the Department of Agriculture makes it 14 bushels, and Prof. S. M. Tracey, from statistics collected at my suggestions and embracing answers from over 200 correspondents from 50 counties, finds the average yield 19 bushels per acre; it is to be remarked, however, that no answers came from counties of low production.

34. SOUTHERN STATES.

		S. C.	Georgia.	N. C.	Alabama.	Tennessee.	Virginia.	Miss.
1.	1862	.....	.....	.....	.....	.....	.....	.....
	1863	.....	.....	.....	.....	.....	.....	.....
	1864	.....	.....	.....	.....	.....	.....	.....
	1865	.....	.....	.....	.....	.....	.....	.....
2.	1866	4.7	4.0	5.8	5 7	5.3	6.7	5.0
	1867	6.4	8.0	6 9	7.8	8.5	8.0	9.5
	1868	5.6	5.6	5.9	6.1	6.6	8.4	9 1
	1869	6.6	7.4	8.4	7.8	8 4	10.5	9.0
	1870	7.0	8.0	8.6	8.4	8.8	9.6	9.7
3.	1871	5.0	5 0	6 0	6.8	5.0	8.0	10.0
	1872	6.1	9 0	8.2	9.5	9.6	8.4	10.3
	1873	5.5	7.0	6 2	7.3	7.2	7.5	9.5
	1874	6.3	7.3	8.0	9.0	9.0	7.8	9.2
	1875	7.0	7.5	7.5	8.5	8.5	8.0	11.0
4.	1876	8.0	6.0	7.3	6.5	8.3	8.5	7.7
	1877	9.9	9 5	8 3	7.0	8.4	10.4	8.0
	1878	5.5	7.0	6.5	7.3	5.0	7.2	6.5
	1879	8.4	9.0	7.0	8.4	8.0	9.2	7.2
	1880	4 8	6.3	6.4	5.4	6.0	9.5	6.5
Total m'n		6.5	7.1	7.1	7.4	7.5	8.5	8.6

MEAN OF 1, 2, 3, 4, PERIOD.

1.	.....	.....	.....	.....	.....	.....	.....
2.	6.1	6 6	7.1	7.2	7.5	8 6	8.5
3.	6.0	7.2	7.2	8 1	7.9	7.9	10.0
4.	7.3	7.6	7.1	6.9	7.1	8 9	7.3

NOTE.—The great differences in the yield of wheat lands from different sections of country, are mainly owing to climatic conditions, more or less favorable to the growth of wheat; yet there can be no doubt but that slovenliness in the cultivation of the soil, and inattention to the production and use of fertilizers has much more to do with meagre returns than is commonly acknowledged to be the case. Proof of this will be found by comparing the returns from the seven groups of States with one another, and the evidences of the robbing process carried on in large sections of our country, and in some, on a vast scale, become incontrovertible. If our soils, as is often claimed, are inexhaustible, then the general decrease in the yield of wheat per acre in all States, except the Eastern, the Northern-Middle and the Bay States, must be explained by other causes; yet it seems to me that the universal use of manures and fertilizers and the careful tilling of the soil in these States are facts sufficiently well established to account for the increased fertility of their lands.

35. EASTERN STATES.

BUSHELS PER ACRE.

	Maine.	N. H.	Vermont.	Mass.	Conn.	New York.	N. J.
1862	16.0	15.0	16.0	17 0	17.0	18.0	19.0
1863	12.0	14.0	12.0	14.0	15.0	14.0	16.0
1864	10.5	12.5	14.0	16.0	16 5	13.0	15.0
1865	13.0	15.3	18.3	17.6	17.5	15.3	12.5
1866	12.7	16.2	20.2	14 9	17.3	15.2	13.5
1867	10.6	12 1	15.8	16.0	17.5	14 5	14.0
1868	10.0	11.7	16.0	15.5	15 5	14.6	13.9
1869	15.4	17.5	18.0	18.0	17 5	16.0	16.5
1870	14 8	14.8	16.8	17.6	17.8	13.8	12.8
1871	13.0	15.2	16.6	18.2	17 0	17.2	18.0
1872	16.0	16.5	16.0	17 4	17.0	12.5	13.5
1873	11.0	15.0	16.0	19.0	18.0	13.5	16.2
1874	15.0	16.0	17 0	14.5	18.0	15.5	15.5
1875	14.0	17.0	17 5	16 0	16.0	*8.0	12.0
1876	12 0	15 0	14.7	18 0	14.5	15.0	13.6
1877	14.0	17.0	19.0	22.0	17.0	18.0	13.8
1878	14 0	14 0	17 0	22.0	13 0	19.0	15 0
1879	16 0	11.7	15.2	18 0	18 0	15.0	12 3
1880	12 3	15 0	16.0	17.0	20.0	17 0	17.0
Total m'n	13.3	14.8	16 4	17.2	16 8	15 4	14.8

MEAN OF 1, 2. 3, 4, PERIOD.

1.	12.9	14.2	15 1	16.1	16 5	15 1	15.6
2.	12.7	14.5	17 4	16.4	17.1	14.8	14.2
3.	13.8	15 9	16.6	17.0	17.2	14.7	15.0
4.	13.7	14.5	16 4	19.4	16.5	16.8	14.3

*The figures marked in this manner were thrown out in the calculations of the means, as it was intended to show the productiveness of the soil uninfluenced by climatic conditions, which caused the partial failures.

36. PRAIRIE STATES.

BUSHELS PER ACRE.

	Kansas.	Missouri.	Iowa.	Nebraska	Minnesota.	Wisc'nsin.	Illinois.
1. 1862	21.0	17.0	14.0	.....	20.0	17.0	14.0
1863	16 0	16.0	14.0	.....	14.0	14 0	12.0
1864	15 0	14.6	12.2	14.0	18.5	9.5	14.5
1865	16.8	12.7	14.6	18.0	20.6	16.8	11.5
2. 1866	21.4	16.5	16.0	26.0	.....	14.5	13.0
1867	14.0	12 4	12.7	15.0	12.5	12.3	11.4
1868	15.6	14 0	14.5	15.5	15 0	13.0	11.5
1869	18.5	14.1	13.0	17.8	16.3	15.3	11.5
1870	15.0	13.0	12.5	14.4	15.2	13.4	12.0
3. 1871	15.9	13.4	10.3	10.3	11.0	12.2	12.3
1872	11.6	*8.8	12.6	12 2	16 5	14.3	12.1
1873	14.0	12.8	13 0	15 5	18.3	16.5	13.5
1874	13.7	13 5	11.6	11.6	13.4	11.5	11.5
1875	17.0	9.0	*9.7	*9 8	17.0	14.0	10.5
4. 1876	14.6	12.4	*6.1	11.5	*8 5	*9 0	*9.3
1877	13.5	14.0	14.5	15 0	18.5	15.0	16.3
1878	16.3	11.0	9.4	13.1	12.0	12.4	13.5
1879	11 0	14 0	10 2	11.3	12.3	12.6	18.7
1880	10.0	14.0	10.4	*8.8	14.4	*9.8	17.2
Total m'n	15.4	13.8	12 6	14.7	15.3	13 7	13.2

MEAN OF 1, 2, 3, 4, PERIOD.

1.	17.2	15.1	13 7	16.0	17.0	14.3	12.8
2.	16.9	14 0	13.7	17.7	14.7	13.7	11.8
3.	14.4	13 2	11.9	12.4	15.2	13·7	12.0
4.	13.1	13.1	11.1	12.7	14.3	13.3	16.4

37. SOUTHERN MIDDLE STATES—NORTHERN MIDDLE STATES.

BUSHELS PER ACRE.

	W. Va.	Kentucky.	Arkansas.	Penns.	Ohio.	Indiana.	Mich.
1862	.....	.....	.....	18.0	16.0	16.0	18.0
1863	.....	.....	.....	14.0	13.0	14.0	13 0
1864	9.3	10 3	.....	12.0	10.3	14.0	12.0
1865	.....	7.2	.....	12.2	*8.5	*8.5	15.7
1866	.....	*6.5	*6.5	11.0	*4.5	*5.9	13 8
1867	10 5	8.2	9.2	12.5	11.6	10.5	12.4
1868	10.7	8.5	13 5	12.8	13.0	11.2	12.5
1869	11.7	11.0	11.8	14.8	15.5	14.4	15.5
1870	11.4	10.0	10.8	12.0	13.8	11.0	14.0
1871	10.0	*6.1	8.4	16 2	13.9	12.0	14.0
1872	10.3	12.0	10.4	10.8	11.7	12.4	12.0
1873	9.6	9 0	10.0	14.2	12.0	11.2	12.2
1874	11.6	10.6	10.5	14 8	15.0	12 2	14.2
1875	.....	10.0	12.3	13.8	*9.5	*9.0	13.5
1876	11.0	10.0	8 2	13.2	11.8	11 0	12.0
1877	12.2	12.5	9.0	13.0	15.0	14 5	17 5
1878	11.5	9.3	*6.0	15.0	18.0	16.0	18.3
1879	13.0	14.0	8.0	15.3	19.5	20.3	19 2
1780	14.0	8.9	7.0	15.0	18.0	17.3	17.8
al m'n	10.8	9.9	9.9	13.7	14.1	13.6	14.6

MEAN OF 1, 2, 3, 4, PERIOD.

1.	9 3	8.8	.....	14.1	13.1	14.7	14.7
2.	11.1	9.4	11.3	12.6	13 5	11.8	13 6
3.	10 4	10 4	10.3	14 0	13 2	12.0	13.2
4.	12.3	10.9	8.0	14 3	16 5	15.8	17.0

38. PACIFIC STATES—BAY STATES.

BUSHELS PER ACRE.

		California.	Oregon.	Nevada.	Delaware.	Maryland.
1.	1862	24.8	.....	....	15.0	14.0
	1863	.....	.....	....	18.0	11.0
	1864	.....	.....	....	12.0	11.5
	1865	.....	.....	....	*7.5	9.5
2.	1866	....	....	....	*8.0	9.7
	1867	16 6	....	....	9.3	11.0
	1868	20.0	....	....	12.0	10.2
	1869	18.2	19.0	25.0	13.5	11.8
	1870	19.0	19.5	25.4	10.0	9.7
3.	1871	11.0	19.2	22.7	11.5	12.0
	1872	12.2	18.2	23.7	9.2	*8.5
	1873	13.5	19.0	22.6	11.0	11.3
	1874	13.2	19.5	19 0	11 0	10.7
	1875	11.0	17.6	19 8	13.5	11.0
4.	1876	13.0	17.0	18.2	16 0	12.5
	1877	9.5	20.0	18.0	13.5	13 8
	1878	17.0	21.0	12.0	13.0	13.0
	1879	14.0	16 0	13.0	13.0	14.4
	1880	16.0	17.0	13.0	15.7	14.0
Total mean..		17.1	14 0	15.4	12.9	11.7

MEAN OF 1, 2, 3, 4, PERIOD.

1.	24.8	.....	.....	15.0	11.5
2.	18.2	19.2	25.2	11.2	10.5
3.	12.2	18 7	21.5	11.2	11.2
4.	13.9	18.2	14 8	14 8	13.5

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" 4. Exports and values of foreign wheat and wheat flour.

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VARIETIES OF WHEAT,

BY

PROF. S. M. TRACY,

Missouri Agricultural College.

VARIETIES OF WHEAT.

BY PROF. S. M. TRACY, MISSOURI AGRICULTURAL COLLEGE.

The question "What varieties of wheat are best for general cultivation?" is one of such vital importance to every wheat grower in the State, that a series of field trials with a number of varieties was commenced in 1877 on the farm of the Agricultural College.

The land selected for the purpose was a field which had been in cultivation for many years, but had received little or no manure and no extra culture except subsoiling in 1874, and again in 1876. The soil was a clayey loam, sloping toward the south, naturally fertile and capable of producing an excellent crop.

In 1874–75–76, the land was cultivated in corn; in 1877 a crop of oats was grown, followed by wheat; the crop harvested in 1880 being the third successive crop of wheat on the same land.

In August, 1878, a portion of the land was manured with a slaughter-house refuse, which was composted with earth in 1876, and was applied at the rate of five two-horse wagon loads to the acre; the remainder of the land was manured with stable manure at the rate of twenty loads to the acre. The wheat was sown so that each variety was grown on land having each kind of manure. The slaughter-house refuse gave the largest straw, but the brightest and the plumpest grain came from the land having the stable manure.

The crop of 1880 showed a slight difference in favor of stable manure.

In July, 1879, the land was plowed about seven inches deep, and was stirred about three inches deep with a corn cultivator just before sowing. On September 28, the wheat was sown with a drill at the rate of one and one-third bushels per acre. No after cultivation was given to the crop.

The crop of 1881 was so badly injured by the chinch bugs that no comparison can be made with the yield of previous years.

The following table gives some of the results of the trials made in 1880, compared with those made in 1878 and 1879. No mention is made in the table of varieties which have given less than fifteen bushels to the acre as an average in these trials:

Name of Variety.	Date when harvested.			Height—feet.		
	1878.	1879.	1880.	1878	1879	1880
Amber	June 21	June 18	June 15	3½	3¼	
Amber Straw	....	....	" 12	....	....	
Arnold's Hybrid	June 19	June 16	" 14	4	4	
Arnold's Victor	....	....	" 18	....	....	
Bull	....	....	" 1	....	....	
Clawson	June 21	June 19	" 21	4½	4½	
Deihl	" 21	" 12	" 12	3	3½	
Dott	" 19	" 16	" 12	3½	4	
Egyptian	....	" 20	" 14	....	3½	
*Fultz	June 17	" 12	" 12	4	3½	
German Amber	....	....	" 14	....	....	
*Gold Medal	June 24	June 19	" 17	4	3½	
Jenning's White	" 19	" 16	" 15	3	3½	
Kentucky	" 11	" 18	" 19	4	3½	
Louisiana	" 21	" 18	" 16	3	3½	
Mediterranean, Bearded	" 17	" 18	" 12	4	3½	
Mediterranean, Smooth	....	" 12	" 12	....	4	
Michigan Wick	June 21	" 18	" 16	3	3½	
Mold's Red	....	" 24	" 22	....	3	
Mold's White	....	" 24	" 22	....	3	
Muskingum	June 19	" 18	" 14	3½	3½	
Nursery	" 25	" 20	" 21	3½	3	
Odessa	....	....	" 14	....	....	
Oregon Club	June 21	June 18	" 16	4	3	
Post	" 25	" 18	" 19	3½	2½	
Red Chaff	....	....	" 17	....	....	
Red Lancaster	June 18	June 18	" 14	4	3½	
Red May	" 8	" 9	" 5	3½	3½	
Red Russian	" 19	" 18	" 14	3	3½	
Sandomirka	....	" 24	" 22	....	3½	
Sanford	June 24	" 19	" 14	4	3½	
Shumaker	" 17	" 16	" 12	4½	3½	
*Silver Chaff	" 25	" 19	" 19	4½	4	
Tappahannock	" 10	" 16	" 9	3½	3½	
Touzelle	" 25	" 24	" 22	4½	3	
Treadwell	" 21	" 20	" 22	3½	3½	
Turkey	....	....	" 17	....	....	
Velvet Chaff	....	....	" 12	....	....	
Washington Glass	....	....	" 18	....	....	
White May	....	....	" 12	....	....	
White Rogers	June 19	June 18	" 14	4	3½	
Zimmerman	" 15	" 19	" 15	3½	4	
Russian, No. 1	" 29	" 21	" 22	3½	3½	
" No. 2	" 9	" 18	" 9	3½	3½	
" No. 3	" 29	" 24	" 23	3	3½	
" No. 4	" 25	" 20	" 22	4½	3½	
" No. 5	" 29	" 24	" 24	3½	3	
" No. 8	July 8	" 23	" 24	4½	3½	
" No. 9	June 29	" 21	" 24	4½	3½	
" No. 10	" 29	" 21	" 24	4½	3½	
" No. 11	July 3	" 24	" 24	3½	3½	
" No. 12	" 8	" 24	" 24	3½	3½	
" No. 13	" 3	" 21	" 22	3½	3	
" No. 14	....	....	" 16	....	....	
A	....	....	" 14	....	....	
B	....	....	" 14	....	....	
C	....	....	" 18	....	....	
D	....	....	" 19	....	....	
Average	....	....	....	....	....	

Weight per bu. pounds.			Bushels of grain per acre.			Weight of straw per acre.			Weight of straw per bu. of grain.			Smooth or bearded.	Color of grain.			Size of grain.		
1878	1879	1880	1878.	1879.	1880.	1878	1879	1880	1878.	1879.	1880		1878	1879	1880	'78	'79	'80
55	62½	63½	20.16	31.08	36.48	2576	3240	3168	122.8	104.4	86.9	S	A	R	R	s	m	m
.....	.....	61	.....	.....	27.56	.....	.....	3266	.....	.....	118.5	B	.....	.....	A	...	...	l
59	61	60½	33.23	36.56	43.87	4592	3820	4255	140.7	104.4	97.0	S	W	A	R	l	l	l
.....	.....	59	.....	.....	28 11	.....	.....	3610	.....	.....	128.4	S	.....	.....	W	...	...	s
.....	.....	64	.....	.....	18.08	.....	.....	1775	.....	.....	98.2	S	.....	.....	R	...	...	m
58	60	59½	28.07	39.42	44 01	2646	3832	4255	96 4	97 2	95 4	S	W	W	W		l	l
55½	61	60	14.42	39.60	37.54	2096	3897	3849	145.3	98.4	102.6	S	W	R	R		m	m
59	62	63	31.04	36 40	39.27	3904	3778	3986	125.8	103.8	101.5	B	R	R	R	l	l	l
.....	60	61	.....	32.19	38.34	.....	3032	3154	.....	94.2	82.3	B	.....	R	R	...	m	m
59	63½	63	15.28	35.90	42 87	1728	2776	3708	113.5	87.0	86 5	S	R	R	R	m	m	m
.....	.....	68	.....	.....	36.97	.....	.....	3240	.....	.....	87.7	S	.....	.....	R	...	...	m
57½	60½	61½	17.39	34.68	37.67	1866	3413	3865	108.5	98.4	102.6	S	W	W	A	l	m	m
59	60½	62½	24.96	55.90	42.02	2848	3576	3890	114.1	99 6	92.6	B	W	W	W	m	l	l
58½	61½	62	25 76	29.04	36.67	3920	2840	3825	152.2	97.8	104.4	S	W	A	A	l	m	l
55	58	61½	19.49	31.18	36 42	2952	2881	3469	151.5	92.4	95.0	S	W	W	W	s	m	m
61	60½	61	21.92	28.60	31 27	3194	3312	3790	145.6	115.8	121.2	B	R	R	R	l	l	l
.....	63	62	.....	39.42	37 80	.....	4313	4575	.....	146.6	121.0	S	.....	R	R	...	m	l
57½	61	62	28.32	34.71	35.31	3245	3665	3540	114.6	105.6	100.3	B	W	W	W	l	l	l
.....	56	58	.....	12 58	8.40	.....	1080	791	.....	85 8	94.2	S	.....	R	R	...	s	s
.....	59	61	.....	23.85	5.12	.....	2562	530	.....	107.0	103.5	S	.....	A	A	...	s	s
58½	64	62½	21.92	32 73	33 54	3088	3496	3385	140 9	106 8	100.9	S	A	R	R	m	m	m
52½	60½	62½	13.30	38.62	29.19	2248	3765	3648	162 0	97.5	124.7	S	W	A	A	s	s	m
.....	.....	61½	.....	.....	43 85	.....	.....	4065	.....	.....	92.9	S	.....	.....	R	...	...	m
56	58½	61½	28.80	31 38	32.22	3600	2768	2815	125.0	82.2	87.3	S	W	W	A	s	m	s
52	59	61	19.49	34 40	35.34	2952	1236	1645	151.5	36.3	46.5	B	W	A	A	l	l	l
.....	.....	61½	.....	.....	36 08	.....	.....	3963	.....	.....	109 8	S	.....	... ..	R	...	...	m
60	60½	62	24.65	29.78	32.66	3552	3484	3520	144 0	117.0	107 7	B	R	R	R	l	l	l
59	62	63	27 52	32.46	27.84	3024	3350	3180	110.5	103.2	114.2	S	R	R	R	s	s	s
60½	58½	60½	24.00	25.70	32.45	4016	3454	3877	167.3	134 4	119.2	S	R	R	R	l	l	l
.....	58½	59½	.....	35.20	33 00	.....	3326	3240	... ...		94.5	S	.....	A	A	...	s	m
59½	61	61½	18.82	33 81	33.56	1952	3631	3485	103 7	107.4	103.8	B	W	W	W	l	m	m
60	60	62	30 56	37.20	31.67	4628	3782	3520	157.3	99.0	111.1	S	A	R	R	l	l	l
59½	60½	61½	17 82	38.47	40.77	1858	3459	3585	104.3	89.4	88.0	S	W	W	W	l	l	l
59½	62	61½	20 32	30.67	31.68	2064	2576	2495	100.2	84.0	78.7	S	W	W	W	m	m	m
56½	56	58	15.68	17.90	17.32	1952	1826	1790	124.5	102.0	100.0	S	R	R	A	l	l	l
57½	61	61½	19.52	52.38	42 09	3227	4620	4155	165.3	88.2	98.7	S	W	W	W	l	l	l
.....	.....	62	.....	.....	41.40	.....	.....	4625	.....	.....	111.7	B	.....	.....	A	...	...	m
.....	.....	61	.....	.....	39 36	.....	.....	3670	.....	.....	93 3	B	.....	.....	R	...	...	l
.....	.....	62½	.....	.....	37.75	.....	.....	3415	.....	.....	95.5	S	.....	.....	W	...	...	l
.....	.....	62	.....	.....	37.36	.....	.....	8895	.....	.....	104.2	S	.....	.....	W	...	...	m
59	60	62½	38.72	38.78	35.74	4304	3420	3015	111 2	77 2	84 4	B	W	W	W	l	m	m
60½	62	62	16.32	32.05	32 86	2224	3692	3420	136.3	115.2	104.1	S	R	R	R	s	m	m
55½	61½	61	14.21	29 15	36.67	2608	3475	3590	185.5	119.2	97.4	S	A	W	A	m	m	s
60	61½	64	23.36	27 36	30.48	2558	2462	2380	100 5	90 0	78.8	S	W	W	W	l	m	m
56½	51½	57½	8 30	35.66	31.79	1872	3509	2880	212.7	98.4	90.6	S	R	R	R	l	m	m
57	60	59½	26.40	25.50	19.95	2992	2922	2414	193 3	114.6	121.0	S	R	R	R	l	s	m
48	57½	55	21.12	29.81	24 48	4320	4900	3860	204 6	164.4	157.7	S	R	R	R	s	s	s
58	59	58½	31.52	32.22	37.65	3952	3673	3940	125.4	114 0	104.6	S	W	W	A	l	m	m
57½	60	61½	24.48	32.44	38 55	4912	2219	2820	200.6	68.4	73.2	B	R	R	R	l	m	m
57½	60	60	17.44	32.07	39 82	4000	3464	3985	229 4	108.0	100.0	B	R	R	R	m	m	m
54½	57½	60	7.38	29.91	30 05	2048	3230	3115	277.5	108.0	103 6	S	R	R	R	s	s	m
52	56	56	9 41	37.48	32 57	1728	3261	2765	183.6	87.0	84.6	S	R	R	R	s	s	m
56½	55½	58	16.80	32.56	26 60	2944	3664	2780	174.0	111.0	104.6	S	A	A	A	m	m	m
.....	.....	61	.....	.....	44.16	.....	.....	4680	.....	.....	106.0	B	.....	.....	R	...	...	l
.....	.....	61½	.....	.....	36 69	.....	.....	3105	.....	.....	84 6	S	.....	.....	R	...	...	m
.....	.....	63	.....	.....	28.66	.....	.....	3115	.....	.....	108.7	S	.....	.....	A	...	...	m
.....	.....	59	.....	.....	41.26	.....	...	4590	.....	.....	111.2	S	.....	.....	W	...	...	l
.....	.....	61½	.....	.....	26 25	.....	.....	3150	.....	.....	120.0	S	.....	.....	A	...	...	l
57½	60	60½	21.93	32.59	33.63	3107	3270	3344	145.6	101.2	100.0	.....	.....	.....	...	.....	.....	....

*In making up the average for 1878, Fultz, Gold Medal and Silver Chaff are omitted, the yield that year having been lessened by accidental causes.

EXPLANATION.—A., Amber; R., Red; W., White; B., Bearded; S., Smooth; s., small; m., medium; l., large.

Many of the varieties mentioned in the table are known by other names in different parts of the State, and below are given a few synonyms: Red Lancaster, known as Lancaster, Mediterranean and Red Sea; Bull, known as Early Michigan, English Bull and Missouri Swamp; Red May, known as Early May, Gold Drop, Tennessee May, Orange, Red May, Yellow Lammas; Zimmerman, known as Democrat, Alabama May, Graham, Walker, Wilson, Late May, Lime, Golden Chaff, Lincoln and New York Premium; Clawson, known as Genessee, White Michigan and Seneca; Mediterranean, smooth, known as Sea Island; Tappahannock, known as Boughton and Golden Amber; Odessa, known as Grass; Mediterranean, known as Swamp, Blue Stem and Lancaster.

This list might be extended much further, and in many cases the same name is applied to entirely distinct varieties. It is probable that the actual number of distinct varieties existing is much smaller than is generally supposed. Each year we receive from various parts of the country, samples of varieties which are supposed to be different from any we have, but which, upon trial, prove to be identical with some of those already tested.

Other varieties, which at first appear to be different, in the course of two or three years become so much like others that it is impossible to distinguish them from each other, if, indeed, there is any difference. This change of character is most noticeable in varieties which have been sent here from a distance, and which have been grown for years in a soil and climate entirely different from our own. The general tendency of most varieties, when grown here, is to become darker in color. A reference to the above table will show that while we had a large proportion of white varieties in 1878, now we have very few, most of them having changed to amber, while many of the amber colored sorts have become red, and, in a few cases, varieties that were originally white have become red.

From the table it will be seen that in 1878 the time of ripening extended from June 8 to July 3, while in 1879 it was several days shorter, beginning June 9, and ending June 24, maturity having been hastened by drouth during the growing season.

In 1880, although the harvest began more than a week earlier, it was not completed until the 24th, the same date as the previous year.

The average yield of the varieties ripening each day is as follows:

Date.	1878.	1879.	1880
June 1	.....	.....	18.08
5	.....	.....	27 84
8	27.52	.....	.....
9	23.36	32.46	31.08
10	20.32	.....	.....
11	25 76	.....	.....
12	.....	34.97	36.07
14	.....	.....	36.03
15	16.32	.....	37.12
16	.....	36.36	38.45
17	22.57	.....	38.38
18	24.65	31.54	35.04
19	28.98	35.69	34.26
20	.....	37.17	.....
21	22.68	31.56	28 67
22	.....	.....	25.91
23	.....	32.22	31.79
24	18.06	27.80	33.85
25	18 54	.....	.....
29	17.11	.....	.....
July 3	16.28	.....	.....

By this it is seen that from the beginning of harvest to June 21, in 1878, and to June 20, in 1879, there is but little difference in the yield, but that after those dates, especially in 1878, the yield decreases. The actual decrease was greater than is indicated by the table, as eighteen varieties, which yielded less than fifteen bushels to the acre, and are not included in the table, all ripened June 29, or later, in 1878, and June 21, or later, in 1879.

In 1880, with the exception of the two early varieties, Bull and Red May, there was very little difference between the early and late ripening sorts; one cause of this variation was doubtless that in previous years late ripening sorts were badly affected with rust, while this year they suffered no more than did the earlier sorts.

It will be noticed, also, that nearly all of the late varieties are of Russian origin, and the fact of their having become somewhat acclimated enabled them to develop better than they had done heretofore. In 1878 these Russian varieties averaged only 18.22 bushels per acre, while in 1879 they averaged 31.29, and in 1880 had increased to 32.73. No. 14, which has not been included in former reports, was obtained from a few scattering heads noticed in 1878. Although they exhibit a marked improvement over former years, the Russian sorts still have too much straw and are too late in ripening to make them desirable for general cultivation.

The average yield of the sixty varieties was larger in 1880 than ever before, although it was the third successive crop of wheat grown on the land, the thorough cultivation every year, the manuring in 1878 and the favorable season more than making up for the exhaustion of the wheat elements in the soil.

Several of the varieties which have succeeded best on the trial grounds have been sown on the farm, and with these Mr. Maddex, the farm superintendent, reports the following results: "In 1879, Clawson, two fields—yield 23 and 26½ bushels per acre. Silver Chaff, 20 bushels. Fultz, two fields, 16 and 25 bushels. These crops were all raised on dry white oak ridges, which have been in cultivation for many years, and have received almost no manure. On one field where Zimmerman was almost a failure in 1878 Sanford and Smooth Mediterranean were grown and yielded fifteen bushels per acre. Mold's White and Mold's Red gave only eleven bushels, and Sandomirka fifteen bushels to the acre."

In 1880 the yields were as follows:

Arnold's Hybrid	25½
Clawson	26½
Deihl	29½
Dott	20½
Egyptian	18½
Fultz	24
Post	16½
Shumaker	25
Silver Chaff	33 7/12
White Rogers	23½
Russian No. 2	24½

In 1881 all varieties were so badly injured by insects that no attempt was made to ascertain the exact yield of each. As a rule, however, the early ripening sorts were much the best, many of the late varieties being entire failures, not even yielding enough for seed for future trials. Fultz, Russian No. 2 and Deihl were among the best. Sandomirka was sown quite largely, but was so late in ripening that it was nearly all destroyed.

The question: "What variety of wheat do you find to be the best?" is asked almost daily, and is one which it is extremely difficult to answer, owing to the infinite variety of soils and locations, and above all to the differences among buyers of wheat. The Clawson furnishes a very marked illustration of this difficulty. For years millers have been strongly prejudiced against it and would seldom buy it without discount of from five to ten cents per bushel. At the National Millers' Association, held in Cincinnati last year, millers who had any personal acquaintance with the Clawson, were about equally divided on its merits. In a very thorough canvass of the St. Louis Board of Trade, made in the fall of 1880, not a single grain dealer could be found who knew any difference between Clawson and any other white wheat, and there were very few who had ever heard of any such variety. Similar inquiries were made at the Cincinnati Board of Trade with like results. Several English millers, who were shown samples of the Clawson wheat pronounced it a very valuable variety for mixing with the harder Russian wheat and preferred it to Mediterranean, which ranks highest with most American millers. The Fultz has suffered from the millers in the same way that the Clawson has, but with far less reason. In several instances, in this and adjoining counties, millers have discounted Fultz ten cents per bushel, but when offered the same wheat under another name, have taken it at the market rate, and after grinding a portion of it have been anxious to engage the whole crop, "it made so much better flour than the Fultz."

For any variety of wheat to be among the best:

First. It must produce a good yield every year. Some of the varieties named in the preceding table have given extraordinary yields for a single year, while in other tests they have fallen much below the average. These differences in yield may arise either from differences in the seasons, deterioration from climatic effects, injury from insects or from local influences of soil and climate. The greatest injury to wheat, whether from climatic or insect causes, usually occurs in this latitude after May 15, so that the sooner after that date the wheat ripens the less it will be exposed to such injury, and the longer the time oc-

cupied in ripening the greater the probability that the rust, heat or insects will destroy a great portion of the crop. On the other hand we find that those varieties which ripen very early do not have time to develop large heads or large grains, and consequently the yield is smaller than the yield of such varieties as have a longer time for growth. In these trials the best yields have been secured from varieties ripening between June 12th and 22d, or at a time between the very earliest and latest harvest. For localities north or south of here these dates would, of course, be correspondingly later or earlier than with us, usually about one day for each thirty miles.

The local effects of soil and climate have a great influence on the yield, but this influence must be learned by local trials alone. Some of our best yielding sorts have proven very poor when sown on a river bottom only a few miles distant.

Second. It must bring the highest market price. Although grain dealers and boards of trade may know very little about special varieties of wheat, millers soon learn the true value of any sort which they may grind, and in the end it is the millers who fix the comparative values of different varieties. But millers, like doctors, do not always agree on the value of a particular variety. To suit a miller wheat must be plump, with a hard flinty grain, and the more it weighs per measured bushel the better. With the fertile soil and warm climate of Missouri the Clawson wheat produces a very soft grain, seldom weighing more than fifty-nine pounds per bushel, and it is universally condemned by the millers. In the cooler climate of Michigan and on the clayey soils of New York the grain becomes very much harder and heavier, and in those States the millers grade it as "No. 1."

In Missouri there is probably no variety of wheat with which the millers are so well satisfied as with the Zimmerman, but unfortunately its yield is so small that the farmer cannot afford to grow it unless he can receive from twenty-five to fifty per cent. more for it than for ordinary varieties. The millers cannot afford to pay much more for this than for other varieties which are almost as good for flour, and so the Zimmerman is rapidly being discarded in favor of varieties which give heavier yields.

The Fultz wheat is moderately hard, and usually weighs from sixty-two to sixty-four pounds per measured bushel. It yields better than does any other common variety, excepting, perhaps, the Clawson, and is now being generally cultivated throughout the State.

Among other varieties which promise well are Diehl, Silver Chaff, White Rogers, Washington Glass, Russian No. 2, and a few others, but

they have not yet been sufficiently tested to recommend for general cultivation.

During the past winter a request was made, personally and through the agricultural journals, that wheat growers should send reports giving the names and yield of the different varieties of wheat grown in their respective localities, and from the replies to this request, the following table has been arranged. Many of the reports were evidently made up after careful inquiry, while others were either greatly overdrawn or give the results of a single unusually large yield. It was impossible in most cases to distinguish the reliable from unreliable reports, and so all are given:

ARKANSAS.

County.	Variety.	Yield per arce.	Correspondent's Remarks.
Washington	Fultz	12.20	Most popular.
	Mediterranean	12 22	
	Tappahannock	12 18	

CALIFORNIA.

County.	Variety.	Yield per acre.	Correspondent's Remarks.
Los Angelos	Odessa	29.0	Soft wheat very liable to rust.
	Seven-headed	30.0	
	Sonona	30.0	
	Yellow Turkey	20.0	

COLORADO.

County.	Variety.	Yield per acre.	Correspondent's Remarks.
Mendocino	Bluestem	14.0	
	Red Club	15.0	
	Smith	27.0	
	White Chili	18.0	
	White Club	20.0	
Weld	Defiance		May supercede the Australian.
	White Australian	22.0	Too soft for milling.

IDAHO.

County.	Variety.	Yield per acre.	Correspondent's Remarks.
Idaho	Club	30.60	Sow either fall or spring.

ILLINOIS.

County.	Variety.	Yield per acre.	Correspondent's Remarks.
Adams	Fultz	20.25	Now heads the list.
	Fultz	30 00	Grown two years.
	N. Y. Premium	15.00	
	Red May	20.00	Often of poor quality.
	Red May	16 00	The standard varieties.
	Zimmerman	16 00	
	Zimmerman	15.00	
Coles	Clawson	20.00	Disliked by millers.
	Fultz	25.00	Sells well; the most popular.
	Swamp	18.00	
Fayette	Alabama White C...	36.00	Small lots only; shatters easily.
	Fultz	35.00	Two reports.
	Mediterranean	20.25	
	Sea Island	10.25	
	Tappahannock	15.20	
Hamilton	Fultz	14.00	
	Sea Island	11.00	
	Tappahannock	9 00	
	Zimmerman	11.00	
Madison	Clawson	26.00	Best for poor lands.
	Clawson	27.00	Hardy, but grain too light.
	Fultz	27.00	Two reports.
	Fultz	26 00	Best for good land.
	Fultz	25.00	The favorite.
	Mediterranean	23.00	Better than Fultz or Clawson in '79.
	Mediterranean	24.00	Preferred by millers.
	Mediterranean		Yield less than Fultz, but fly-proof.
	Peters		Yield small but very early.
	Zimmerman	20 00	
Mason	Bull	25 00	
	Fultz	30.00	
	Gold Drop	15.00	
	Michigan Amber...	23 00	
	Red May	18 00	
	Red May	20.28	Very hardy; lives without snow.
	Red New York	35 00	
	Sea Island	18 00	
	Turkey	25.30	
	White Chaff	15.00	
	White May	15.00	
Massac	Clawson		Does not succeed well.
	Fultz	10.30	The favorite.

ILLINOIS—CONTINUED.

County.	Variety.	Yield per acre.	Correspondents' Remarks.
lassac	Mediterranean	6.18	
	Tappahannock	2 30	Being discarded.
	Zimmerman	5.15	
lenard	Bluestem	20.00	
	Fultz	25.00	
	Genesee	25 00	
	Lancaster	20.25	Stands winter well.
	Large White	15.00	Liable to injury in winter.
	Mediterranean	33 00	Best.
	Red May	18.00	
	Small White	19.00	
	Velvet Chaff	20.25	
ontgomery	Clawson		Small lots have given large yield.
	Fultz	20.30	
	Fultz	30.00	Lord prairie; yield double any other variety.
	Mediterranean	20 30	
lke	Clawson	22.00	Two reports.
	Fultz	23 00	Average of 14 farms, 868 acres, prairies and "barren land."
	Fultz	17.00	River bottom.
	Fultz	26 00	
	Genesee	22 00	Prairie.
	Gold Drop	23 00	
	May	17.00	
	Swamp	25 00	
	Walker	16.00	
andolph	Amber Straw	10 20	
	Egyptian	10.20	
	Fultz	12 30	
	Sea Island	10.20	
azewell	Fultz	14 00	
	Velvet Chaff	22.00	
ermillion	Fultz		One-third to one-fourth more than any other.
Vabash	Clawson	15 00	
	Fultz	20.00	
	Lancaster	10.30	

INDIANA.

County.	Variety.	Yield per acre.	Correspondents' Remarks.
Carroll	Clawson	21.00	
	Fultz	15.00	
	Mediterranean	15 00	
	Reedstraw	10.00	
Daviess	Clawson		Unsatisfactory.
	Fultz	10.25	The favorite.
	Fultz	20.30	
	Mediterranean	8.20	
	Mediterranean	15.25	
Elkhart	Clawson	35 00	1878.
	Clawson	25.00	1879.
	Fultz	26.00	
	Fultz	20 45	Most popular.
	Gipsey	20.30	Discarded.
	Mediterranean	20.25	Discarded.
	Other varieties	18.00	
Fayette	Fultz	12 ½	
	Silver Chaff	16.00	
Fountain	Fultz	22 00	The leading variety since 1876.
	Fultz	20.25	
Jay	Fultz	20.00	1880.
	Gipsey	20.00	1879.
	Gipsey	14.00	1880.
	Kentucky	30 00	1879.
	Kentucky	25.00	1880.
Knox	Fultz	15.30	The surest variety.
	Mediterranean	20.25	
	Tappahannock	20.25	Often killed by spring frosts.
Lagrange	Fultz	38.00	One crop only.
Marion	Fultz	15 45	1879.
	Fultz	15.30	1880, straw strong and good.
	Mediterranean	20.00	1879.
	Mediterranean	14.00	1880.
Parke	Clawson		Yield inferior to Fultz.
	Fultz	20.00	The best. 40.44 lbs. good flour per bushel.
	Mediterranean		Yield inferior to Fultz.
Sullivan	English White	14.15	Clay.
	English White	10.12	Prairie.
	Fultz	20.45	Clay.
	Fultz	14.16	Sandy Prairie.
	Gipsey	20.25	Clay.
	Gipsey	14.16	Prairie, not thoroughly tested.
	Mediterranean	16.17	Clay.
	Mediterranean	12.13	Sandy Prairie.
Tipton	Clawson	15.30	Not as well liked as Fultz.
	Fultz	15 30	Gives general satisfaction.

IOWA.

County,	Variety.	Yield per acre.	Correspondents' Remarks.
Allamakee	Fife	6.00	
	Lost Nation	8 00	
	Mammoth	5.00	
	Red Russian	5.00	
	Red Winter	10.00	
	White Winter	7.00	
Butler	Sea Island	17 00	Average for 3 years.
Cass	Australian	10.18	
	Fife	7 19	
	Odessa	12.25	Hardiest variety.
	Rio Grande	10 18	
	Tea	8 11	
	White Russian	15.23	Does not ripen evenly.
Dubuque	Clawson	12.00	
	Odessa	15.00	
Harrison	Champlain	104 04	¼ acre planted 1 foot apart each way and cultivated by hand.
	Eureka	30 50	
	White Fife	20.30	
Scott	Lost Nation	20.00	1878.
	Lost Nation	15.00	1879.
	Lost Nation	12.00	1880.
	Odessa	12.00	Liked by millers.
Story	White Russian	16 00	
Van Buren	Clawson	20.00	
	Fultz	20 00	

KANSAS.

County.	Variety.	Yield per acre	Correspondents' Remarks.
Anderson	Fultz	20 00	
	Zimmerman.	20 00	
Butler	Mediterranean.	13.00	
	Zimmerman.	13.¼	
Cherokee	Amber	15.00	
	Black Sea	15 00	
	Zimmerman.	15.00	
Dickinson	Early May	30.00	Most popular.
	Zimmerman.		Never fails.
Douglas	Fultz	30.00	
	May		Best quality, but poor yield.
	Mediterranean } Turkey }		Yield better but poorer in quality. Best for poor soils.

KANSAS—CONTINUED.

County.	Variety.	Yield per acre.	Correspondents' Remarks.
Ellsworth	Red May	15.25	Very hardy. Best quality.
	Fultz	35-45	Yield of good season. Tender.
	Odessa	15.20	Can be sown Oct. 1 to March 1, but ripens unevenly.
	Turkey	15.40	
Harvey	Early May	8.00	10 fields reported.
	Fultz	13 1/2	3 fields reported.
	Gold Drop	11 1/2	3 fields reported.
	Mediterranean	18 1/2	1 field reported.
	Odessa	13.00	1 field reported.
	Zimmerman	9 1/2	8 fields reported.
Leavenworth	Clawson	21.25	Uncertain.
	Fultz	26.85	
	Mediterranean	25.00	
	Red May	14 25	
	Zimmerman	15.18	Shatters badly.
Ottawa	Clawson	14.00	
	Odessa	13.00	
	Red May	13.00	
	Velvet Chaff	17.00	
	White Michigan	15.00	
Osage	Turkey	38.00	Most popular. Very hardy.
	Turkey	27.00	1879.
	Turkey	34 00	1878.
	White May	20 38	
Phillips	Odessa	20.40	The best.
Russell	Red May	17 00	Most hardy and best yielder.
Sumner	Big May	11.00	
	Blue Stem	12 00	
	California May	11 00	
	Clawson	12 00	
	Fultz	14.00	
	Genesee	10.00	
	Little May	5.00	
	Odessa	14 00	
	Swamp	6.00	
	Zimmerman	7.30	Has been most popular but is giving way to the Fultz.
Wyandotte	Clawson	20.00	
	Egyptian	35.00	
	Fultz	25.00	
	Red May	35.00	Sometimes 45.
	Velvet Chaff	20 00	

KENTUCKY.

County.	Variety.	Yield per acre.	Correspondents Remarks.
Christian	Fultz	13.00	Gaining in popularity.
	Fultz		Most popular among farmers. Not liked by millers.
	German Amber	14.00	
	Georgia Rust Proof	17.00	
	Red May	11.00	
	Tappahannock	13.00	
Fayette	Early White	20.00	
	Fultz	20 00	
	Golden Medal	20.00	
	Michigan Amber	15.00	
	Silver Chaff	25.00	
	Arnold's Victor	20.00	
Garrard	Fultz	8 35	Preferred to any other.
	Mediterranean	7.00	
	Ohio Swamp	6.70	
	Yellow Sommers	10.15	
Henderson	Mediterranean	22 00	1879.
	Mediterranean	14.00	1880. The most popular variety.
Logan	Amber	25.00	
	Fultz	36.00	The leading variety.
	Odessa	30.00	Next to Fultz.
	Tappahannock		Formerly a favorite but now discarded.
Ohio	English Rock	27.00	
	Fultz		Becoming popular.
	Golden Amber	18.00	
Shelby	Alabama	10.15	Most popular with millers.
	Fultz	30 00	1879.
		20 00	1880.
	Odessa	45.00	1879.
		40.00	1880.
Todd	Fultz	25.30	Best for thin land. Lodges badly on rich land.
	Golden Chaff	12.15	
	Tappahannoch	13.20	
Trimble	Clawson		The favorite.
	Fultz		Next to Clawson.
Washington	Amber	15.00	
	Fultz	17.00	
	Odessa	19.00	

MARYLAND.

County.	Variety.	Yield per acre.	Correspondents' Remarks.
Howard	Fultz	15.4	Sandy loam.
Cecil	Mediterranean	20.0	Most popular variety.
	Mediterranean	22.28	
Washington	Fultz	28 00	Average of three reports.
	Gold Medal	20.00	
	Silver Chaff	25.00	
	Velvet Chaff	33.00	

MICHIGAN.

County.	Variety.	Yield per acre.	Correspondents' Remarks.
Allegan	Clawson	25.00	
	Silver Chaff	32.00	
	Velvet Chaff	30.00	
Barry	Clawson	20.35	
	Fultz	20 30	
Berrien	Clawson	19.00	3 to 4 cents discount per bushel.
	Fultz	19.00	Leading variety.
Cass	Clawson	25.00	Three reports.
	Clawson	15.40	
	Deihl	21.00	Will out yield any other on good soil.
	Diamond	20.00	
	Egyptian	19 00	
	Fultz	26 00	Two reports.
	Fultz	25.40	
	Fultz	40 00	Best red wheat.
	Gipsey	20.00	
	Gold Medal	30.00	
	Lancaster	20.25	
	Mediterranean	24.00	
	Treadwell	40.00	
Eaton	Clawson	25.00	Report of Supervisor of Rexand.
	Fultz	30 00	
	Lancaster	20 00	
	Lincoln	15.00	
	Treadwell	20 00	
	Velvet Chaff	10 00	
Genesee	Clawson	23 00	Has superseded all others.
Hillsdale	Bluestem	25 00	
	California	18 00	
	Clawson	20.00	
	Egyptian	20.00	
	Fultz	23.00	
	Wicks	15 00	

MICHIGAN—CONTINUED.

County.	Variety.	Yield per acre.	Correspondent's Remarks.
Ingham	Clawson	20.00	Agricultural College. Most popular yield and quality considered.
	Clawson	21.00	Only variety grown.
	Fultz		Growing in favor.
	Shoemaker	15.00	Agricultural College Farm.
Ionia	Clawson	15.00	1880.
	Clawson	21.00	Average for three years.
	Fultz	20.00	1880.
	Fultz	37.00	Average for four years.
Kalamazoo	Clawson	29.00	
	Fultz	35.00	More liable to smut and less to rust than Clawson.
	Lancaster	25.00	
Kent	Clawson	25.45	Best yield—price 2 cents below par.
	Clawson	25.00	
	Fultz		As popular as Clawson.
	Sandomirka	16.00	
Lapeer	Clawson	25 00	75 per cent. of entire acreage.
Lenawee	Canada Victor	26.00	
	Clawson	40.00	
	Clawson	20.25	
	Clawson	15.40	Hardy—most popular.
	Clawson	32.00	Average of three reports.
	Deihl	15 30	
	Deihl	10.45	
	Egyptian	20.00	
	Egyptian	22.24	
	Epyptian	18.35	
	Fultz	20.50	Most popular—50 per cent. of entire crop.
	Fultz	15.45	Hardy. Millers diagree as to quality.
	Fultz	20.30	
	Gold Medal	32.00	Average of four reports.
	Jennings White	10.40	Yields well but dull sale.
	Lancaster	15.27	Lodges in strong land.
	Lancaster	12.22	
	Lathrop	20 00	
	Sea Island	20 00	
	Tappahannock	10.40	Preferred by millers.
Livingston	California Red	20 51	
	Clawson	8½ 61	
	Deihl	6½.21	
	Fultz	7.38	
	Lincoln	7½.19	
	Treadwell	11.26	
Oakland	Clawson	30.00	Decidedly the best.
	Deihl	30.00	
	Soules	20 00	
Shiawassee	Clawson	14 00	Most largely raised—grain light.
	Deihl	10 00	
	Red Lancaster	14.00	Grain heavy—makes good flour.

MICHIGAN—CONTINUED.

County.	Variety.	Yield per acre.	Correspondent's Remarks.
Van Buren	Clawson	25.00	Nine tenths of entire crop.
	Fultz		Preferred by some—weighs sixty-five pounds per bushel.
Washtenaw	Clawson	33 .00	1878.
	Clawson	23 .00	1879.
	Clawson	23 .00	1880.
	Clawson	26½ 00	Average for three years.

MINNESOTA.

County.	Variety.	Yield per acre.	Correspondents' Remarks.
Blue Earth	Brooks		The leading variety.
Fairbault	White Fife	18.00	1879.
	White Fife	20.00	1880.
	White Fife	30.00	1880 on new land.
Freeborn	Canada Fife	19 00	
	White Russian	20.00	
Lyon	Brooks	18.00	
	Lost Nation	22.00	
	Scotch Fife	14 00	
	Rio Grande	15 00	
	White Russian	20.00	
Martin	Brooks	10.15	Hard.
	Lost Nation	10.15	Soft.
	Rio Grande	8.12	Soft.
	Scotch Fife	5.10	Soft.
	White Michigan	5.10	Soft.
Stevens	Lost Nation	20.00	
	Scotch Fife	10 00	
	White Russian	12.00	
Wabashaw	Brooks	6.12	
	Fife	6.00	
	Lost Nation	12.20	
	Rio Grande	10 00	
	White Russian	15.00	

MISSOURI.

County.	Variety.	Yield per acre	Correspondents' remarks.
Andrew	Clawson	15.25	
	Fultz	15.25	
	Red May	10.15	
	Red straw	15.18	
	Tappahannock	10.15	
Atchison	Doty	27 00	Spring.
	Red May	15.00	
	Odessa	22.50	Sown March 1, 1880.
	Odessa	13.00	Sown March 30, 1880.
	Odessa	9.00	Sown September, 1879.
Audrain	Fultz	20.00	
Barry	Fultz	18.00	Said to be uninjured by the fly.
	Mediterranean	12 00	
	Zimmerman	10.00	
	Zimmerman	5 20	
Bates	Fultz		5.10 bu. per acre more than others.
Benton	Egyptian		Not satisfactory.
	Tappahannock	15.50	
	Zimmerman	23.00	
Caldwell	Early May	25.00	
	Golden Chaff	12.50	
	Mediterranean	12.50	
Callaway	Clawson	23.00	Lodges badly.
	Fultz	23.00	
	Velvet Chaff		Best for flour.
Carroll	Blue Stem	25.00	Bottom land.
	Egyptian	12.15	
	Fultz	15.20	
	Fultz	25.50	
	Mediterranean	12.15	
	Red May		Destroyed by insects.
Cass	Clawson	14.00	
	Fultz	25.00	Hazel land.
	Fultz	21.00	Prairie land.
	Fultz	21.00	White oak land.
	Fultz	20 50	Hickory land.
	Fultz	22 00	Prairie land.
	Fultz	13 00	Injured by drouth and rust.
	Fultz	12.30	Two years.
	Fultz		Best variety.
	Mediterranean	16.25	Two years.
	Zimmerman	7.00	
Christian	Egyptian	18.25	
	Fultz	18.25	Growing in favor.
	Mediterranean	18.25	
Clinton	Red May	5.25	
	Mediterranean	20.25	

MISSOURI—CONTINUED.

County.	Variety.	Yield per acre	Correspondents' remarks.
Cole	Clawson	17.00	Thin clay land.
	Fultz	22.00	Clay and loam.
	Red May	19.00	Rich bottom.
	Tappahannock	19.00	Rich bottom.
Crawford	Fultz		
Dent	Tappahannock	8.00	
	Zimmerman	12.00	
Franklin	Clawson	16 00	
	Fultz	20.30	Best variety for poor soils.
	Fultz	15.00	
	Fultz	16 00	Other varieties about 14.
	Red Lancaster	20.00	
	Tappahannock	20.30	On good land, very poor on thin soil.
Grundy	Fultz	15.30	The best.
Harrison	Fultz		Sometimes yields better, but winter kills.
	Red May	10.30	
	Red Straw	15 35	The best.
Hickory	Gipsey	10.12	
	Zimmerman	8.10	
Holt	Red May	34.00	
	Tappahannock	45.00	
Howard	Amber		Yields well but shatters badly.
	Clawson	18.28	Rusts and shatters.
	Fultz	20.40	Best; 75 per cent. of present crop.
	Mediterranean	20.30	Best for cold prairie soil.
Johnson	Clawson		Sprouts too easily in wet weather.
	Fultz	25.00	
	Fultz	20 00	Almost no other grown.
	Fultz	34.00	Leading variety.
	Fultz		Best yield.
Lafayette	Blue Stem	20.00	
	Clawson	30.00	Grain poor quality.
	Early May	20.00	
	Fultz	25.00	
	Graham	15.00	
	Graham	20.00	
	N. Y Amber	20.00	
	Red Lancaster	15.00	
	St Louis	20.00	
	Silver Chaff	20.00	Grain poor quality.
Lawrence	Egyptian	11.28	
	Fultz	25.38	Prairie land.
	Fultz	20 27	Bottom land.
	Mediterranean	20 26	Bottom land.
	Mediterranean	12.25	Prairie land.
Macon	Early May	18.00	

MISSOURI—CONTINUED.

County.	Variety.	Yield per acre	Correspondents' remarks.
Marion	Clawson	23.00	
	Fultz	22.00	
	Mediterranean	17.00	
	Michigan Red	23.00	
	Tappahannock	16 00	
	White May	15 00	
	Zimmerman	20.00	
Mississippi	Fultz	18.00	
	Red Tappahannock	16.00	
	Tappahannock	15 00	
	Velvet Chaff	16.00	
Monroe	Fultz		Yields best and is very heavy.
Montgomery	Fultz	15.00	Best for high land.
	Fultz	20.00	Best for low land.
	Michigan Red	20.00	Best for low land.
	Zimmerman	12.00	Best for high land.
Morgan	Clawson	26.00	Only one crop.
	Mediterranean	9.10	
	Zimmerman	14.15	
New Madrid	Fultz	25.00	
	Velvet Chaff	23.00	
Nodaway	Fultz	17.00	Promises well.
	Red May	18.00	
	Red Straw	20.00	Red varieties preferred.
Osage	Clawson		Yield better than Fultz, but not so hardy.
	Fultz	22.00	Average of six reports.
	Red Chaff	17 00	
	Tappahannock	15 00	
	Zimmerman	77.00	Average of two reports.
Perry	Fultz	16.00	Others average eight.
Pettis	New York Flint	18.24	
	Red May	8.12	
	Zimmerman	12.20	
Phelps	Early May	8.00	
	Fultz	12.00	
	Zimmerman	11.00	Average two reports.
	Zimmerman	5.20	
Pike	Fultz	20 00	Uninjured by the fly.
	Zimmerman	8.00	Injured by the fly.
Ralls	Clawson	20.00	
	Clawson	25 28	
	Diehl	50.00	
	Fultz		5 and 10 bushels per acre more than any other—claimed to be uninjured by the fly.
	Fultz	25.00	
	Fultz	25.35	
	Gold Drop	20.00	
	Red May	12.18	
	Red May	22.00	
	Zimmerman	15.24	

MISSOURI—CONTINUED.

County.	Variety.	Yield per acre	Correspondents' remarks.
Randolph	Fultz		The most satisfacty sort.
	Sea Island	15.00	
St. Charles	Golden Chaff	8.12	
	Red May	12.15	Very sure crop.
	Sea Island	16.00	Average for 5 years.
St. Clair	Billey	9.00	
	Clawson	12½	
	Fultz	18¾	Average of about forty reports.
	Mediterranean	17⅛	
	Zimmerman	18¾	
St. Francois	Fultz	18.28	
	Golden Chaff	8.12	
	Ramsay	6 80	
	Red May	12.15	
	Red Tappahannock	10.12	
	Tappahannock	12.15	
	Sea Island	16.00	
	White May	10.12	
	Zimmerman	10.25	
St. Genevieve	Fultz	15.30	Growing in favor.
	Tappahannock		Sometimes good, but often fails.
	Zimmerman	10 20	A sure crop.
St. Louis	Fultz	40 00	One crop of 25 acres.
Saline	Clawson	20.00	
	Fultz	27 00	
	Red Lancaster	15.30	
	Red May	17 00	
	Red May	10.15	
	Shoemaker	28.00	
	Zimmerman	23.00	
Stoddard	Fultz	35 00	
	Tappahannock	38.00	
	Velvet Chaff	30.00	
	White May	30.00	
	Yellow Lambert	18.00	
Vernon	Fultz	14.20	
	Fultz	8.10	Prairie land.
	Fultz	32.00	
	Mediterranean	22.00	
	Red Lancaster	15.25	Bearded varieties best for prairie.
	Tappahannock	14.20	Bald varieties best for timber.
	Zimmerman	10 15	Timber.
	Zimmerman	10.15	
Webster	Fultz	20 00	Best for upland.
	Mediterranean	10 00	Best for bottom land; stand the winter well.
	Red Lancaster	12.00	
	Zimmerman	15 00	Best for upland.

NEBRASKA.

County.	Variety.	Yield per acre	Correspondents' remarks.
Gage	Cherokee	15 25	Sring; most reliable variety.
	China Tea	14 00	Spring.
	Early May	18.20	
	White Russian	10 00	Spring.
Lancaster	China Tea	8.12	Average quality; not hardy.
	Gold Drop	8.10	Extra quality; medium hardy.
	Odessa	10.18	Good quality; very hardy.
	Sea Island	12 20	Extra quality; very hardy.
	White Russian	8.18	Average quality; not hardy.
	Early May	15.30	Good quality; very hardy.
	Fultz	10.20	Good quality; not hardy.
	Odessa	10.30	Extra quality; not hardy.
Richardson	Red May	5 25	
	Odessa	10.25	
	White Russian	20.30	
Sarpy	California Beauty	10.18	
	Golden Drop	10.00	
	Odessa	10.22	

NEW JERSEY.

County.	Variety.	Yield per acre	Correspondents' remarks.
Burlington	Fultz	30.33	The best variety.
Camden	Fultz	25 30	The best variety.
Monmouth	Clawson	26.00	Two crops.
	Fultz	34.00	Fifteen crops.
	Mediterranean	21.00	Six crops.

NEW YORK.

County.	Variety.	Yield per acre	Correspondents' remarks.
Allegany	Clawson	10.85	Fifty-six to fifty-eight lbs. per bu.
	White Colorado	20 30	Sixty ponds per bushel.
	White Michigan	15.30	Fifty-eight to sixty-one lbs. per bu.
	White Mix	25 45	Sixty to sixty-four lbs. per bushel; stands winter best.
Cayuga	Clawson		Makes best yield, but poor flour.
Chatauqua	Clawson	28 00	1880, manured land.
	Clawson	22.00	1879
	Deihl		Uncertain.
	Mediterranean	26.00	
	Treadwell		Uncertain.
Chemung	Clawson	38 00	
	Fultz	35.00	
	Post	25.00	
Erie	Clawson	25.28	Fifty-six to fifty-eight lbs. per bu.
	Fultz	36.00	
	Fultz	28.33	Most popular.
	Mediterranean	20 25	
	Treadwell	22.50	
Livingston	White Rogers	40.00	
Monroe	Fultz	35.00	
	Silver Chaff	25 00	
	Velvet Chaff	28.00	
Ontario	Clawson	40.00	Fifty acres in 1880.
	Clawson	20 40	Almost the only variety grown.
Orange	Clawson	20.25	Most popular, but makes poor flour.
Orleans	Clawson	39 00	
	Russia	26.00	Two years.
Seneca	Clawson	40 00	Most popular, originated in this Co.
	Fultz	40 00	
	Jennings White	30 00	
	Velvet Chaff	33.00	
Steuben	Clawson	28.00	Most popular variety.
Tompkins	Clawson	46.50	On N. Y. Agricultural Coll. Farm.
	Clawson	62.00	Average of one crop; four acres.
	Clawson	25.00	Average for several years.
	Clawson	40.00	Fifty acres in 1880.
Ulster	Clawson	25.30	Most popular; winter kills on undrained land; other sorts better for flour.

NORTH CAROLINA.

County.	Variety.	Yield per acre.	Correspondents' Remarks.
Granville	Fultz	10.00	
	Little Red	12.00	The best.
Stokes	Clawson	14 00	
	Fultz	12.50	
	Red Lancaster	6.00	

OHIO.

County.	Variety.	Yield per acre.	Correspondents' Remarks.
Ashland	Australian	38.00	
	Bohemian	28.00	
	Canada	36.00	
	Clawson	40.00	
	Clawson	20.25	
	Fultz	40.00	The most popular.
	Fultz	25.30	The leading variety.
	Gipsey	35.00	
	Halletts	32.00	
	Lancaster	35.00	
	Mediterranean	28.00	
	New Zealand	32.00	
	Touzelle	22 00	
	W. Mediterranean	27.00	
	Wicks	38 00	
Belmont	Clawson	16.00	
	Fultz	28.00	Two reports.
	Gold Medal	25.00	
Butler	Clawson		Very popular.
	Fultz	22 00	Smallest yield; bottom land.
	Fultz	38 00	Largest yield; bottom land.
Clark	Clawson	18.00	
	Fultz	25 30	Leading variety.
	Gold Medal	18.00	
	Mediterranean	20.25	Best for flour.
	Sandomirka	25.00	
Columbiana	Amber	20 00	
	Buckeye	18.00	
	Clawson	18.00	
	Clawson	20.00	
	Fultz	28.00	
	Fultz	25.00	
	Lancaster	19 00	Two reports.
	Springdale	15.00	

OHIO—CONTINUED.

County.	Variety.	Yield per acre.	Correspondents' Remarks.
Darke	Fultz	20 25	
	Fultz	25.35	1879.
	Mediterranean	15.20	
Erie	Fultz	24.00	Two reports.
	Silver Chaff	25.00	
	Velvet Chaff	20.00	
Fayette	Fultz	40.00	
	Silver Chaff	40.00	
Franklin	Clawson	25 50	Agricultural College Farm.
	Fultz	27.00	
	Gold Medal	31.00	
	Sandomirka	30.00	
	Silver Chaff	33.00	Agricultural College Farm.
	Velvet Chaff	28.00	
Hamilton	Gold Medal	5.00	
	Mich. Amber	20.00	
	Sandomirka	18 00	
Hocking	Fultz	.....	Leading variety, but shows tendency to smut.
	Silver Chaff	... ...	Promises well.
Huron	Fultz	35 00	
	Gold Medal	24.00	
Licking	Clawson	15.25	
	Fultz	20.30	
	Gipsey	15.20	
	Mediterranean	15.20	
	Michigan Red	15.27	
Loraine	Clawson	27.00	
	Silver Chaff	20.00	
Madison	Egyptian	19 00	
	Silver Chaff	25.00	
Medina	Fultz	28.25	
	Fultz	30 00	
	Gold Medal	25.00	
Miami	Clawson	30.00	
	Silver Chaff	27 50	
Morrow	Fultz	20.00	
	Silver Chaff	24.00	
Muskingum	Clawson	25.00	
	Gold Medal	11.00	
Preble	Fultz	28.00	
	Gold Medal	18.50	
Richland	Fultz	30.00	
	Silver Chaff	30.00	

OHIO—CONTINUED.

County.	Variety.	Yield per acre.	Correspondents' Remarks.
Sandusky	Clawson	25 35	
	Fultz	25 35	
Starke	Fultz	30.40	By far the best.
	Fultz	35 00	
	Silver Chaff	30.00	
Summit	Fultz	40.00	
	Velvet Chaff	27.00	
Vinton	Fultz	14 00	
	Sandomirka	24.00	
Washington	Clawson	20.30	
	Fultz	10 25	Better on high and sandy soils than on bottom lands.
	Fultz	25 00	
	Fultz	38.00	
	Fultz	20.00	
	Gold Medal	20 00	
	Mediterranean	18.00	
	Red Lancaster	20.25	
	Sandomirka	25.00	
	Silver Chaff	25 00	
	Tappahannock	10.20	
	Velvet Chaff	33.00	
Williams	Fultz	27.00	
	Gold Medal	18 00	
	Velvet Chaff	27.00	

OREGON.

County.	Variety.	Yield per acre	Correspondents' remarks.
Clackaruas	Clawson		Not liked by farmers.
	Odessa	25.00	The popular variety.
Umatilla	Club	30.00	Average cultivation.
	Club	40.00	Thorough cultivation.
	White Winter	50.00	Shatters so badly that it is not popular.

PENNSYLVANIA.

County.	Variety.	Yield per acre	Correspondents' remarks.
Armstrong	Fultz	18.25	
Beaver	Arnold's Victor		Rusted badly in 1880.
	Clawson	20.00	
	Fultz	25.00	Principal variety sown in 1880.
	Gold Medal		Rusted badly in 1880.
	White Rogers	15.00	
Cumberland	Red Lancaster	20.80	The best for general use.
Erie	Fultz	25.00	
	Velvet Chaff	20.00	
Lancaster	Fultz	30 00	The variety generally sown.
Lehigh	Clawson	18.00	
	Fultz	25.00	
	Mediterranean	21 00	
	Shoemaker	20.00	
Mercer	Clawson	35 00	
	Fultz		
	Jenning's White		
	Red Lancaster	20.00	
Union	Clawson	18.00	
	Fultz	12.00	
	Master	25.00	
	Red Lancaster	14 00	
	Shoemaker	16.00	
	Washington	22.00	

TENNESSEE.

County.	Variety.	Yield per acre	Correspondents' remarks.
Bedford	Fultz	15.85	
	Clawson		Yield large, but liable to rust.
	Mediterranean	10.15	The surest.
Robertson	Fultz	10.20	Most hardy; makes less flour.
	Georgia Red	10.20	
	Tappahannock	11.20	

TEXAS.

County.	Variety.	Yield per acre	Correspondents' remarks.
Bastrop	Waterson	10.30	
Wise	Big Red May	10.25	
	Little May	18.15	
	Little White	8 20	
	Tappahannock	8.20	
	Zimmerman	10 18	

VIRGINIA.

County.	Variety.	Yield per acre	Correspondents' remarks.
Henrico	Clawson		The most popular; improving in character each year.
	Fultz	18.50	
Prince Edward	Clawson	24 00	Does not fill well.
	Fultz	30.00	
	Victor	30.00	
Roanoke	Sandomirka	35.00	
Shenandoah	Fultz	20.30	
	Heeges	38.00	
	Mediterranean	20.25	
	Red Lancaster	15.20	
	Silver Chaff	30.00	

WEST VIRGINIA.

County.	Variety.	Yield per acre	Correspondents' remarks.
Hampton	Amber	18.25	
	Fultz	20 25	Mountain land.
	Fultz	10.00	Bottom land.
	Mediterranean	18 25	
Marion	Amber	15 00	
	Clawson	20 00	Not very hardy.
	Fultz	26.00	
	Gold Medal	20.00	The favorite with millers.
	Lancaster	12.00	
	Michigan White	16.18	

The foregoing table shows the yields and the most popular varieties in different States to be as follows:

States.	Variety.	Yield.	No. of counties reporting.
Illinois	Clawson	22.0	6
	Fultz	24.0	20
	Mediterranean	21.6	6
	Red May	19.0	5
	Sea Island	15.4	4
	Tappahannock	14.2	3
	Zimmerman	14.7	[illegible]
Indianan	Clawson	25.9	4
	Fultz	23.8	17
	Gipsey	18.8	5
	Mediterranean	18.8	[illegible]
Iowa	Odessa	15.2	3
Kansas	Clawson	17.3	4
	Fultz	25.5	6
	Odessa	18.8	5
	Red May	20.9	5
	Turkey	31.6	4
	Zimmerman	14.5	5
Kentucky	Fultz	23.1	8
	German Amber	15.7	3
	Mediterranean	14.3	3
	Odessa	38.5	4
Michigan	Clawson	26.3	30
	Deihl	20.8	5
	Egyptian	21.7	5
	Fultz	28.8	15
	Lancaster	19.1	6
	Treadwell	26.2	3
Minnesota	Brooks	13.2	[illegible]
	Lost Nation	17.6	[illegible]
	Rio Grande	11.7	[illegible]
	Scotch Life	9.4	[illegible]
	White Life	22.7	[illegible]
	White Russian	16.8	[illegible]
Missouri	Billy	9.0	[illegible]
	Clawson	21.5	[illegible]
	Early May	17.8	[illegible]
	Egyptian	18.2	[illegible]
	Fultz	20.4	[illegible]
	Golden Chaff	10.8	[illegible]
	Graham	17.5	[illegible]
	Mediterranean	17.4	[illegible]
	Michigan Red	21.5	[illegible]
	Odessa	14.8	[illegible]

YIELDS AND MOST POPULAR VARIETIES—CONTINUED.

States.	Variety.	Yield.	No. of counties reported.
Missouri	Red Lancaster	17.9	6
	Red May	17.0	5
	Reedstraw	20.5	4
	Sea Island	15.8	4
	Tappahannock	20.0	13
	Velvet Chaff	23.0	4
	White May	18.7	3
	Zimmerman	16.1	64
Nebraska	Early May	20.8	3
	Odessa	16.6	3
	White Russian	13.5	3
New Jersey	Clawson	26.0	2
	Fultz	33.5	17
	Mediterranean	21.0	6
New York	Clawson	34 3	17
	Fultz	35.3	5
	Mediterranean	24 3	3
North Carolina	Fultz	11.3	2
Ohio	Clawson	24.4	13
	Fultz	28.2	31
	Gold Medal	19.6	10
	Red Lancaster	23 9	4
	Mediterranean	20.7	5
	Sandomirka	24 5	5
	Silver Chaff	27.9	11
	Velvet Chaff	27.0	4
Oregon	Club	35.0	2
Pennsylvania	Clawson	22.8	4
	Fultz	23.1	6
	Red Lancaster	19.8	3
Virginia	Fultz	22.8	3
West Virginia	Fultz	19.5	3

Of course it is not claimed that the preceding tables give the true, or even the exact comparative values of the different varieties named, but, in most cases, they doubtless give very nearly the comparative values.

Many letters have been received which bear so directly upon the best choice of varieties that a few extracts are given, as follows:

George Gibbs, Holden, Johnson county, Missouri: "The Fultz is the very best wheat for our windy prairies, and our self-binders handle it without much waste. It will stand dead ripe two weeks. I tried three acres of Clawson past year. I don't recommend it; the heads are very brittle and fall off with the least touch."

H. Mills, Mayview, Lafayette county, Missouri: "The Fultz seems decidedly the best on rich ground, but yields less in proportion as the ground becomes poorer. The Lancaster does well on poor soil. The Graham seems most easily injured by insects."

W. B. Smith, Boles, Franklin county, Missouri: "The Tappahannock, on good, strong or clover land, produces twenty to thirty bushels, but on thin uplands it is a very poor variety. The Fultz is the best for thin lands, and is equal to the Tappahannock for good land. The Michigan Red (probably Red May. S. M. T.,) is a few days earlier than is the Tappahannock, and is best adapted to strong, new and wet lands. After it is ripe it will stand a ten days' rain without falling down."

M. O. Taylor, Bourbon, Crawford county, Missouri: "I have tested a large number of varieties of wheat, but as yet have found none that come up to the Fultz. I introduced it here about six years ago, and it has superceded almost every other variety. It yields better, stands the frost better, is less injured by wet when in the shock or stack, and makes better flour. I find further that a red or amber wheat is much better adapted to our climate and soil than is a white wheat."

W. H. Thomas, Salem, Dent county, Missouri: "The Tappahannock and Walker (Zimmerman) are the varieties most largely grown here. Our soil is sandy and usually the wheat is sown broadcast and the land is not manured in any manner, and the usual yield is only from eight to twelve bushels per acre. A few farmers here who use drills and manure raise about twenty-five bushels per acre, and one or two who have used clover as a green manure have grown as much as forty-five bushels per acre."

C. P. Sebastian, Edwardsville, Illinois: "The Fultz stands all kinds of weather better than does any other variety of wheat yet introduced in this locality. In this neighborhood, I think the average yield will not fall below twenty-five bushels per acre, and in many cases it has yielded forty bushels."

S. E. Cress, Hillsboro, Ill.: "I have run a threshing machine every year for twelve years, and have noticed that with the introduction of Fultz wheat in this section the yield has been increased very materially. Previous to the introduction of this variety, the 'Indiana Yellow' was grown here principally, with occasionally fields of May wheat. In threshing, I noticed that when the 'Fultz' and either of the old varieties was sown on the same farm, the yield of the former was nearly one-half greater.

"We find but little difference between the yield of the Fultz and of the Red Lancaster, but the latter is much more liable to lodge, and there is always more straw to handle for the same quantity of grain. The Lancaster is very easily threshed, and shatters out badly when allowed to get very ripe.

"As a thresher, I dislike the Fultz wheat, because when damp, it is almost impossible to thresh it clean out of the head, and when dry it cracks or 'cuts' badly; on the other hand, the berry is usually plump and heavy. The Lancaster is also heavier than the old varieties.

"The Clawson has been tried by some farmers, and the yield has been fully equal to that of the Fultz, but whether it would be so if sown as widely as the Fultz, I'm not prepared to say. Farmers have been slow to adopt it, because the millers object to it."

Kennedy & Kennedy, Metropolis City, Massac county, Ill.: "1. Futz—hardy requires less seed per acre than any other stiff straw; not subject to rust; stands longer when ripe, and yields better than any other; makes poor flour; yield, from 10 to 30 bushels per acre; is the favorite with most farmers here.

"2. Mediterranean—not subject to rust; straw long and limber; easily lodged—with rain and wind; seldom makes a large yield, but always makes some; yield from 8 bushels per acre, and makes medium flour of yellow cast

"3. Orange—yields poor; straw hard and wiry; seldom rusts; makes good, plump grain, and the best flour of any wheat raised here; heads short; yields from 5 to 15 bushels per acre.

"4. Tappahannock—uncertain; subject to rust; soft, limber straw; easily lodged; easily damaged while in the shock or stack; often falls before ripe, though sometimes yields well; makes good flour, very white; yields from 2 to 30 bushels per acre; playing out rapidly.

"5. Clawson—similar to the above; has been cultivated here only three years, and has proved very unsatisfactory."

J. M. Latta, Goshen, Elkhart county, Indiana: "In 1870, Clawson yielded 35 bushels per acre, and Fultz 26 bushels; in 1879, Clawson gave 25 bushels, and other varieties about 18 bushels; the berry of the Clawson, which was at first white, has grown darker and harder every year; my wheat was grown only on clover sod, and I must admit that the Fultz is the favorite variety in this county."

F. S. Sleeper, Galesburg, Kalamazoo county, Michigan: "I regard the Clawson as decidedly the best variety for this locality; during the five years that I have grown it, it has increased in yield every year, and has also improved in quality; 40 bushels per acre is not an unusual yield in this county, and there are instances where nearly 60 has been grown. Fultz is the next leading variety; it yields well; is quite free from the attacks of the Hessian fly, and has one advantage over the Clawson, in that it over-weighs several pounds to the measured bushel, while the Clawson seldom weighs 60 pounds to the measured bushel. Lancaster does well on low, moist ground, and occasionally yields *very well.*"

E L. Russell, Tecumseh, Lenawee county, Michigan: "Clawson—white, large berry; light weight; stands up good; not very tall; heads even, and cupping over when ripe; bald, red chaff; quite hardy; yields from 15 to 40 bushels per acre; capable of going 50 or more.

"Fultz—medium sized red berry; heavy weight; usually plump; stands well and thick upon the ground; very hardy; bald, white chaff; heads rather small, and not standing even on top; yields from 15 to 45 bushels per acre; capable of going 60; millers disagree as to quality.

"Lancaster—red, medium long berry; very heavy weight; always lodges on strong land; bearded; heads small; very hardy, succeeding on poor soil; culture and seasons better than most varieties; yields from 15 to 27 bushels per acre; highly recommended by millers.

"Egytian, Lathrop, Morgan or Bald Mediterranean, are all the same, being red, medium, long berry; heavy weight; bald straw; standing well; yields from 15 to 27 bushels per acre, and like the Lancaster, highly esteemed by millers.

"Delhi—once very popular; has deterioated, and is inclined to shrink under unfavorable circumstances; it is a white wheat; small, round berry; bald, red chaff; straw short; even, and standing up well; if not a club head, it closely resembles it; yields from 10 to 45 bushels per acre; capable of going 60 or 70; millers prefer it to Clawson.

"Tappahannock—once quite popular; is a white wheat; white chaff; bald; heavy; medium tall; yields from 10 to 40 bushels per acre; preferred by millers.

"Jennings White—a white wheat; bearded; stands very well; midling hardy; yields from 10 to 40 bushels.

"White Wabash—resembles Tappahannock; heads longer; inclined to rust and shrink."

E. Dennison, Forestville, Chatauqua county, New York: "The kinds giving the best satisfaction now are the Clawson and Red Mediterranean; Clawson, principally, has been sown about five years; hardens each year, and now makes first class flour; averages about 22 bushels to the acre. In 1879, my average on 18 acres (Clawson) was 22 bushels to the acre. In 1880, my average of 4 acres Mediterranean was 26 bushels to the acre; I think the yield would have been better if it had not been so thick; one and a half bushels of seed (small berry) was drilled in to the acre; one bushel would have produced more grain: nine acres (Clawson) averaged in same year 28 bushels per acre from one and a half bushels seed, drilled in; soil, light gravel; stuble, fair condition; fertilized with a top dressing of composted stable manure; nine two-horse wagon loads to the acre, harrowed in before sowing."

I. P. Roberts, Agricultural College, Ithaca, New York: "The variety raised in this, Tompkins and adjoining counties, is Clawson; a strong growing, hardy variety of white wheat, originating within ten miles of us. It takes its name from a Mr. Clawson, who discovered a few heads in his field some ten years since; without doubt, it came originally from California, as California wheat was grown on the land a few years prior to the finding of the new variety by Mr. Clawson. It makes a very white flour, but being deficient in gluten, the bread dries out quickly, and much fault is found with it by bakers. When mixed with Minnesota spring and ground, it is A No. 1. Henry Swan, of Geneva, New York, threshed 2,000 bushels from 50 acres; Frank Cornell, of Ithaca, claims 62 bushels per acre from 4 acres; I raised this year from a small piece, 46½ bushels per acre, (although this was not a good year for wheat with us); our best lands give an average of about 25 bushels per acre, one year with another, but poor lands and poorer farmers reduces the yield of the State far below this. A new variety, Fultz, is coming into general use, and I think a majority of farmers like it better than the Clawson, believing that it yields more. It is a white chaffed, beardless variety, and like the Clawson, does not make good flour, unless mixed with other wheat."

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SIXTEENTH ANNUAL REPORT

OF THE

State Board of Agriculture

OF THE

STATE OF MISSOURI,

FOR THE YEAR 1882.

JEFFERSON CITY:
STATE JOURNAL COMPANY, STATE PRINTERS,
1883.

Note.—The Secretary did not have the privilege of reading the proof and indexing this report.

J. W. SANBORN, SEC'Y.

SEC. 4050. The public printer shall, annually, under the direction of the president of the state board of agriculture, print fourteen thousand copies, of which two thousand shall be in the German language, of the annual report of the said board of agriculture; five hundred copies to be bound in cloth, balance in paper covers, to be distributed as follows: Twenty copies to each member of the general assembly, fifty bound copies to the state library, thirty copies to each county clerk for distribution among the farmers, as generally as may be, and the remainder to the state board of agriculture, to be distributed among the several agricultural and horticultural societies and farmer clubs of this state and other states, as the board may direct: provided, that said annual report shall not contain more than five hundred pages. (Laws 1875, p. 3, § 1.)

Members of the State Board of Agriculture.

T. T. CRITTENDEN, Governor of Mo., (ex-officio), Jefferson City, Cole county.
R. D. SHANNON, Supt. Public Schools, (ex-officio), Jefferson City, Cole county.
S. S. LAWS, President State University, (ex-officio), Columbia, Boone county.
J. W. SANBORN, Dean Agricultural College, (ex-officio), Columbia, Boone county.
JOHN WALKER.....Jefferson City, Cole county.
N. J. COLEMAN.....St. Louis.
E. C. MOORE.....Columbia, Boone county.
K. M. LEAR.....Hannibal, Marion county.
H. ESHBAUGH.....Hanover, Jefferson county.
C. E. LEONARD.....Bell Air, Cooper county.
W. H. SMITH.....Huntsville, Randolph county.
R. W. GENTRY.....Sedalia, Pettis county.
M. F. DOUD.....Kansas City, Jackson county.
D. A. ELY.....Sublett, Adair county.

PREFATORY.

NOTE—Owing to the unfortunate sickness of the Secretary of the Board, Rev. R. W. Gentry, about the 1st of December, while in midst of pressing duties, I received from the Executive Committee of the Board a request that I take "such matter as may have been prepared by Mr. Gentry and proceed to make a report of 130 to 150 pages." This report, I was informed, must be made at once. Secretary Gentry, prevented by illness, had collected but two original papers—one by Mr. Bell, which had come down from Ex-Secretary McAfee, and one by the President of the Board, Hon. John Walker. With much reluctance, I entered upon the work, knowing that it would be entirely impossible to publish, in so brief a time, a work creditable to the Board, and the agriculture of a State of such varied and promising resources. As expected, able specialists in the practice and science of agriculture, to whom I applied for papers, were unable to attempt the work in the time at our command, while other papers promised have failed to appear.

J. W. SANBORN,
Acting Secretary.

To the General Assembly of the State of Missouri:

The Sixteenth Annual Report of the Board of Agriculture is respectfully submitted.

The past year has been a fruitful one to the agricultural interests of the State, The bountiful crops of the season have not been followed by the low range of prices incident to redundant markets. The unusually small stock of the cereals carried over from the season of 1881, and that prosperity that has marked the past few years of the country continuing, and preventing the necessity of sales close to the margin of actual wants, values have remained at remunerative rates.

Our farmers have been fortunate in harvesting a good corn crop, while the more Northern and Eastern States have suffered somewhat severely in their acreage product; thus our farmers are enjoying light crop prices on fortunate yields. There have been no disturbing influences to record to check the rapid, yet sound development of the agricultural industries of the State. The rapid absorption of the available National tillage lands, the fine location of the State, our unsurpassed tillage and pasturage lands and mild winters insure not only as marked a development of agriculture as has characterized the past decade, but insures a more significant change. The agriculture of Missouri is to broaden still, but to deepen as well as to broaden.

The law establishing a Board of Agriculture, and defining the duties of its Secretary says, regarding his report to the General Assembly: "As well as a general view of the condition of agriculture and horticulture throughout the State, accompanied by such recommendations, including, especially, such a system of public instruction upon those subjects, as may be deemed interesting and useful."

That system of farming that always has and will attend the fatness of fresh soil, has had its legitimate day and work over the major portion of the State; and a period has been reached in the development of the whole country, and of available markets for our farmers; in the crop yields of prevailing methods, and in the disposal of those crops, when systems and methods belonging to an older country are demanded. An opinion is often expressed that an intelligent, spirited people will adjust themselves to the demands of their situation. This may be true, yet observation teaches that social and industrial methods, like personal habits, yield only to pressure—a pressure that leaves its finger-marks, while they should move in advance of necessity, leaving it in the back-ground. A wise and liberal, yet economic policy on the part of the State, will very materially affect the "onward march" of its agriculture. Great questions shadow the industry. Immense quantities of food materials (straw, corn, fodder, etc.,) are burned, trampled out in feeding or are unskillfully fed. Immense quantities of grain and valuable hay are dissipated in storms and winds and cold weather, from the bodies of unsheltered animals to the insatiable skies. Fifty-six pound of corn are ordinarily sold for one-half as many cents, yet one pound of butter of western creameries will bring more cents than fifty-six pounds of of corn. Thousands of acres of land are worked at yields that scarcely pay. Can the immense quantities of wasted foods of the State, with actual nutritive qualities, be so presented to stock as to be utilized with economy? Can a system of winter shelter be devised and shown to be economical for stock men to follow? Can the interest of individual farmers and of the State be shown to lie in the direction of more butter sales and less of corn? Has the point ar-

rived when a system of soil fertilization for multitudes can be shown to be profitable? As these, and multitudes of other undemonstrated questions for Missouri are unanswered, so far as practice indicates, the question arises, are they not worth answering? If so, who shall look for a solution of them, individual farmers or the State? The policy of the State is already settled, its fostering influence being pledged to this industry, it perceiving that that which cheapens food production, aids every action by cheapening the cost of living, and thus justifies its action. The importance of the solution of the many perplexing problems of economic farming, leads to the recommendation of the inauguration of an experiment station. Doubtless these stations are the most efficient factors in the promotion of the art and science of agriculture of any that the industry has ever known; their work has proved a wonderful stimulus to European agriculture. Sir John B. Laws, of England, over forty years ago, began, and has ever since conducted at great, but private expense, farm experiments that are invaluable to the world. Boussingault of France, and others in Germany, notably, Baron Von Liebig, began work at about the same period, greatly enriching the farm fund of knowledge. Not until 1852-53 was the first experiment-station founded at Leipsic. This was founded by farmer's subscription and Government aid; so pronounced was its success that Europe in twenty-five years had 120 in active work, and has more now. This movement has but just taken root in this country, six stations being now in working order, namely, in North Carolina, Connecticut, New Jersey, New York, Ohio and Massachusetts. Connecticut made the first movement in the direction. So satisfactory has been the work of those first started, that it may be safely predicted that in a brief time, one or more will exist in every State of the Union. In this direction of farm investigation, I may say, having the matter in charge, that the State Agricultural College Farm will do all the experiment work that its limited means will allow. Assistance will be asked of your honorable body for this purpose, it is to be hoped, however, that some broad measure may be enacted that will insure permanent and comprehensive investigations.

The question of public instruction in its specific relation to agriculture, demands your thoughtful deliberation. Agriculture may have flooded on under the guide of empiricism in the past in an endurable manner; but the researches of the immediate past have thrown such a flood of light upon the causes (laws) that govern in each department of farming, that thoughtful farmers and men of the profession are recognizing farming as one of the most if not the most, intricate of the professions, when carried on upon the plane of its real requirements. Dealing with nature in all of her operations, it requires but a moment's reflection to convince that the farmers' efforts are modified more by nature's laws than those of other industries, and that

he deals with causes in a more complex and varied form than others. It seems axiomatic that he who works most in harmony with law, works to best advantage. These remarks seem general; specifications seem needless; yet as one statement in emphasis of the thought, I venture to say, on the basis of personal experience, that if the laws of animal nutrition were well understood and applied by every farmer of the State, that millions would be added to its yearly revenue. The educational movement of the age is towards industrial teaching and training. It should set more strongly towards technical education for the farmer than for others, because he constitutes the largest class; his industry is the basic one feeding all others; his skill or want of it sets the price of existence, even, for all; his prosperity is the prosperity of all. Cheap bread means stable society. The State may well be interested in the character of the education of the coming farmer. It is believed that primary education in the elementary laws of agriculture for the common school students of the State, should receive your attention. Europe has set the precedent, especially France; and Tennessee, in this country, has followed, introducing an elementary work, especially prepared, into its schools. Such a movement could not fail to prove of incalculable value to the Missouri of the future.

I would call your attention to the fact that over a year ago the State Agricultural College inaugurated a distinctively industrial course of studies. Those sciences directly applicable to Agriculture, in conjunction with field work, as illustrative of school room teaching, and for learning the art of husbandry, are taught. The course covers two years. This course is more distinctively technical than found at any other college of the country that I now recall. The system is on trial; it is in its early stages, but promises success. Placed on the same basis as industrial education in other fields, success must attend it. It was made for the farmers, and it is hoped that that they will send their sons in response to its offers.

By reference to the proceedings of the Board at its annual meeting it will be seen that the Board proposes to make active efforts to stimulate and aid the farming interests of the State. Under the action taken already, one, and I think the first, Farmers' Institute Meeting of the State, has been called at Independence. Others are to be instituted. Specialists in the varying departments of agriculture will present their knowledge and experience at each of these meetings. Securing the aid of the press it is hoped to give wide influence to this work, so successfully prosecuted in other States. Broader work is proposed, the consummation of which rests with or depends upon the action the Honorable Assembly may take at its session.

PROCEEDINGS

OF THE

STATE BOARD OF AGRICULTURE,

AT ITS

ANNUAL SESSION FOR 1881.

The State Board of Agriculture, in pursuance of law, met at the Agricultural College building, November 2d.

President Walker in the chair.

The President reviewed several matters of interest to the Board.

The Board, he thought, should take an interest, in the investment and use of the money in the hands of the Curators, arising from the sale of public lands donated by the United States for our Agricultural College.

He urged the necessity of a Committee on Legislation, whose duty it shall be to present to the Legislature the needs of the Board, in order to accomplish the work committed to it and expected at its hands by the farmers of the State.

The utility of feeding experiments and of test of farm machinery were instanced as illustrations of work desirable to be done.

Prof. Swallow of the Agricultural College exhibited a recording dynamometer for testing the draft of farm implements.

At this point a recess until 2 P. M. was taken.

The Board met at 2 P. M.

On motion of Col. Moore, the hour of 11 o'clock, November 3d, was fixed for election of officers.

On motion of Prof. Swallow, a committee of three was appointed to arrange a programme for the next annual meeting. G. C. Swallow, E. C. Moore and H. Eshbaugh were appointed said committee.

Adjourned to 9 A. M. November 3d.

NOVEMBER THIRD.

The Board met according to adjournment.

Corporate members present: John Walker, H. Eshbaugh, M. R. Lear and E. C. Moore. *Ex officio* members present: G. C. Swallow.

On motion, the Board went into the Committee of the Whole on credentials.

J. P. Homer presented credentials as delegate from the Boone County Agricultural and Mechanical Association. On motion, he was accepted as an *ex officio* member.

W. N. Beattie presented his credentials as delegate from Gasconade county.

On motion of G. C. Swallow, the further consideration of credentials was postponed.

Following a report of the Committee of the Whole a roll call was ordered.

The following members responded to their names: John Walker, H. Eshbaugh, M. R. Lear, E. C. Moore, G. C. Swallow and J. P. Homer.

A quorum not being present, the Board adopted the following resolution:

Resolved, That this Board take a recess until the second Tuesday of December next.

On motion of G. C. Swallow, the Secretary was instructed to notify all agricultural and mechanical societies in the State of the adjourned meeting.

On motion of G. C. Swallow, the Board proceeded to recommend persons to fill vacancies in the corporate membership of the Board.

J. P. Homer, on motion of E. C. Moore, was named in place of George Husmann.

E. C. Moore was named for the place of C. A. Newcomb, by motion of G. C. Swallow.

On motion of H. Eshbaugh, D. N. Thompson of Bates county was named for the place of G. R. Buckner.

G. C. Swallow moved that William Smith of Randolph county be named in place of H. C. Jocland.

The Secretary was directed to forward these names to the Governor and request their appointment.

On motion, the Board recommended to the Governor for appointment as Curators of the University of Missouri, Wm. Scott Snively of Nodaway

county, in place of A. W. Dockery, resigned, and Wm. Smith of Randolph county in place of Jno. Walker, resigned.

On motion of R. M. Lear, the following resolution was adopted:

Resolved, That the Committee on Legislation of this Board be instructed to endeavor to secure a revision of the law organizing this Board in such manner as to extend its powers, granting it the right to hold its meetings when deemed for the best; also to enable its Secretary to make, by provision, a monthly report; also to entitle it to a representative in the Board of Curators of the University of Missouri.

The Committee on Business Programme, for next annual meeting, submitted the following:

Your committee would report in favor of having papers prepared on the following subjects by persons named.

Varieties and culture of corn,	R. B. Maddex.
Artichokes,	J. C. Evans.
Clover,	R. W. Gentry.
Forage Grasses,	R. M. Lear.
Pasture,	N. W. Bliss.
Irish and sweet potatoes,	S. M. Tracey.
Oats,	H. G. Wilson.
Ensilage,	G. C. Swallow.
Raising and curing tobacco,	John Walker.
Beef cattle,	L. Palmer.
Mutton sheep,	E. C. More.
Draft horses,	J. Walker.
Best means of awakening an interest in agricultural education,	H. Eshbaugh.
Sale of tobacco	Col. Roshie.
Hedges,	Jno. Hinton.

Your committee also recommend that measures be taken to secure short papers, accompanied by electrotypes for portraits, on all the important breeds of domestic animals for the next report, and that that report be published on or before the meeting of the next General Assembly.

(Signed.) G. C. SWALLOW.
E. B. MORE.
H. ESHBAUGH.

A recess was then moved and carried until December 2d, Tuesday at 11 a. m.

MORNING SESSION.

December 13, 1881.

The Board met according to vote November 3d.

President Walker called the meeting to order.

N. J. Coleman moved that a committee on credentials be appointed. Carried.

N. J. Coleman, G. C. Swallow and R. W. Gentry were appointed.

The Chairman reported that Dr. A. H. John of Kirksville, Adair county, C. E. Leonard of Cooper county, and Wm. Smith of Randolph county have been appointed by the Governor corporate members of the Missouri State Board of Agriculture and are entitled to seats as members.

The Board then took a recess until 2 p. m.

EVENING SESSION.

Met at 2 P. M.

The majority of the Committee on Credentials submitted the following report:

A majority of your Committee on Credentials report that in addition to the three corporate members recently appointed by the Governor, and who were seated in the Board during the morning session, that the following named gentlemen are duly authorized to represent Agricultural Societies, and entitled to seats in the Board during the meeting, and entitled by law to all the rights and privileges of corporate members, except the right of voting for officers of the Board, which privilege the majority of your committee find to be limited by law and precedents to the Board corporate including the permanent *ex officio* members, namely, the Governor, State Superintendent of Schools, President of the State University, Dean of the Agricultural College.

C. Weber of St. Louis, St. Louis Agricultural and Mechanical Association.

A. P. Clarkson of Columbia, Saline County Agricultural and Mechanical Association.

W. W. Batterton of Columbia, Cole County Agricultural and Mechanical Association.

E. W. Herndon, Pike County Agricultural and Mechanical Association.

B. F. Snyder, Knox county, Shelby, Knox and Lewis County Association.

J. A. Valandingham, Boone county, Joplin Fair Association.

Capt. D. E. Shea, Mexico, Audrain County Agricultural and Mechanical Association.

Respectfully submitted,

N. J. COLEMAN.

R. W. GENTRY.

MINORITY REPORT.

E. C. Moore submitted the following minority report.

The undersigned begs to submit the following as a minority report of your Committee on Credentials.

The report of the majority is concurred in so far as it extends to receiving the delegates of the different county Agricultural Societies as members of this Board, but is entirely dissented from in its provisions undertaking to deprive them of the right of voting for officers. To the minority of your committee such provision is contrary to law and precedent, subversive of the spirit and intention of the whole organization, and would, in the judgment of the minority, be a most dangerous and unfortunate step, materially impairing the usefulness of this organization with an almost certain tendency of arraying against it the hostility of the great agricultural masess of this great State, who by law are intended to be in part represented in this organization by said delegates.

The minority report would, therefore, urge upon this honorable body the propriety of admitting said county Agricultural Society delegates to full membership at this meeting, thereby placing them upon an even footing with other *ex officio* members who are present, and whose right to vote at this meeting can no more be questioned than can that of said delegates.

All of which is respectfully submitted with the hope that it will be adopted as the sense of this Board.

Signed. E. C. MOORE,

For Minority of Committee on Credentials.

Dr. John moved the adoption of the majority report.

Mr. Eshbaugh moved an amendment of Dr. John's motion, by substituting the minority for the majority report.

R. W. Gentry supported the majority report.

After some further discussion a motion to adjourn to 7:45 P. M., was carried.

Upon reassembling, after some further discussion, a vote by roll call on the motion to substitute the minority for the majority resulted as follows:

AYES—E. C. Moore, H. Eshbaugh, J. P. Horner.

NOES—John Walker, N. J. Coleman, M. R. Lear, R. W. Gentry, A. H. John, Wm. Smith, C. E. Leonard.

Mr. Eshbaugh called for a division of the majority report. This was refused by the chair.

The vote by roll call on the majority report was as follows:

AYES—John Walker, N. J. Coleman, M. R. Lear, R. W. Gentry, A. H. Johns, Wm. Smith, E. C. Leonard.

NOES—E. C. Moore, H. Eshbaugh, J. P. Horner.

On motion of A. H. Johns, the Board proceeded to elect its officers for the ensuing year:

John Walker, President.

R. W. Gentry, Secretary.

Wm. Smith, Vice-President.

S. M. Tracy, Treasurer.

The Treasurer's report was referred to a committee of two for examination—G. C. Swallow and E. C. Moore, Committee.

Mr. Moore moved that the traveling expenses of the Board be paid out of the Treasury. An amendment was moved by Dr. S. S. Laws, referring the matter to a committee. Accepted. Committee not appointed.

Adjourned until 8:30 A. M.

MORNING SESSION.

December 14.

An invitation was received from Prof. Fichlin to visit the University Observatory. Accepted.

A vote of thanks was tendered to Prof. Fichlin.

A resolution of thanks to the citizens of Columbia for the hospitality and courtesy shown them during the session of the Board, was offered by Dr. Johns. Carried.

By motion of R. W. Gentry, the programme of work arranged for the annual meeting for 1882, at the November meeting, when a quorum was not present, was adopted.

The Board then adjourned to meet at the call of the President

Signed. J. P. McAFEE, Secretary.

PROCEEDINGS

OF THE

Missouri State Board of Agriculture,

FOR THE YEAR 1882.

AGRICULTURAL BUILDING, COLUMBIA, MO., NOV. 1st, 1882.

The Missouri State Board of Agriculture met according to law at 10 o'clock A. M., and a quorum not being present, adjourned till 2 o'clock P. M.

TWO O'CLOCK P. M.

The Board was called to order at 2 o'clock P. M., Hon. John Walker in the chair.

While waiting for the ex-Secretary, Mr. J. P. McAfee, to deliver to the Secretary the minutes of the Board, the President, in an informal talk, proceeded to give a brief history of the Board from its organization in 1865 down to the present time. He spoke of the embarrassments under which the Board had labored in the past, on account of the refusal of several Secretaries to deliver to their successors the minutes and other property of the Board. He recommended that one-third of the membership of the Board retire annually, so as to limit the period of membership to three years, instead of an indefinite period, as at present. He further recommended that the Secretary be selected carefully and retained, and that the salary of the office be increased. He spoke eloquently of the resources of the State and the grand outlook of the agricultural interest. He spoke of the Agricultural College and faculty in the highest terms, showing how the interests of the farmers were fostered.

Messrs. M. F. Doud and D. A. Ely presented commissions of appoint. ment as members of the Board, vice Messrs. A. H. John and W. C. Moore and were enrolled without formal action.

While still waiting for the minutes, Prof. J. W. Sanborn, recently elected a member of the Agricultural Faculty, and formerly a member of the Agricultural Faculty of New Hampshire, made some very practical remarks concerning the Agricultural College of Missouri and the work before it.

Roll called here. Present: Laws, Sanborn, Walker, Eshbaugh, Gentry, Doud and Ely.

The minutes of the regular meeting of November, 1881, and the adjourned meeting of December, 1881, were read and adopted.

The President, Hon. John Walker, made some remarks explanatory of the minutes, dwelling more particularly upon the lawsuit recently decided, concerning the secretaryship; Mr. J. P. McAfee, Secretary of the Board prior to December, 1881, claiming that the election of his successor was illegal, on account of the representatives of Agricultural Societies being debarred from voting by the Board Corporate, brought suit before the Supreme Court to have the matter decided. The decision of the court was that only corporate members and the four permanent *ex-officio* members could legally vote in the election of officers.

On motion, Messrs. Eshbaugh and Doud were appointed an auditing committee on the Treasurer's report, to report at 10 o'clock A. M. to-morrow.

On motion, it was ordered that the election of officers be the next order of business after said report.

Dr. Laws invited the Board to attend chapel service to-morrow.

The invitation was accepted.

The question of Farmers' Institutes was mentioned by Prof. Sanborn and informally discussed by Messrs. Sanborn, Eshbaugh and Walker.

On motion, Messrs. Sanborn, Eshbaugh and Gentry were appointed a committee to report on the subject of said institutes.

On motion, Messrs. Walker, Gentry and Ely were appointed a Committee on Legislation, to report to-morrow.

Dr. Laws suggested, among other things, that the Board make an arrangements with Prof. Sanborn similar to that made with Prof. Tracy by the State Horticultural Society, for experiment work on the farm.

Messrs. Doud and Ely also spoke concerning Farmers' Institutes.

On motion, adjourned till to-morrow after chapel service.

MORNING SESSION.

Thursday Morning, 10 o'clock A. M.

The Board called to order.

President Walker in the chair.

The Committee on Treasurer's Report made the following report:

We, your committee, appointed to examine the accounts of the Treasurer of this Board, submit the following as their report.

We find by examining the books and vouchers of the Treasurer, that no report was made on his account last year. The committee has therefore examined the books for two years and find that there was in the hands of the Treasurer at the annual session in November, 1880:

Cash	$ 348 61
Cash received during the year	1,250 00
Making a total of	$1,598 61
Paid per vouchers	1,454 65
Leaving a remainder November, 1881	$ 143 96
Received during the year 1882	1,967 50
Making total cash on hand and received to November 2, 1882	$2,111 46
Paid out as per vouchers to date	804 84
Leaving in the hands of the Treasurer, Nov. 2, '82, cash balance of	$1,306 62

H. ESHBAUGH,
M. F. DOUD,
Committee.

On motion, the report was adopted and the committee discharged.

The election of officers was next in order and was proceeded with, with the following result:

For President: Hon. John Walker.

For Vice-President: Prof. J. W. Sanborn.

For Secretary: R. W. Gentry.

For Treasurer: Prof. S. M. Tracy.

President Walker, chairman of the Committee on Legislation, made the following report:

"Your Committee on Legislation would respectfully report that the legislation needed is as follows:

"SECTION 1. That the time of the annual meeting be changed from the first Wednesday to Wednesday after the second Tuesday in November.

"SEC. 2. That sections 4044 and 4047 be revised so as to be relieved of conflicting terms and words.

"SEC. 3. That a section be enacted requiring three members to retire annually and three to be appointed; so that one-third of the Board be appointed each year.

"SEC. 4. That the Board ask for an appropriation of $5,000 biennially and also an appropriation for a barn and mill upon the College Farm.

"SEC. 5. That the salary of the Secretary be raised to $2,000 per annum.

"SEC. 6. That quarterly reports be printed and that the annual reports be made up by compiling these.

"SEC. 7. That the manner of paying for the printing of reports be changed and be the same as that of all other public printing."

JOHN WALKER,
R. W. GENTRY,
D. A. ELY,
Committee.

On motion, the report was considered, section by section. Moved to amend the first section so as to read "the second Wednesday in October." Moved to amend the amendment so as to read "the Wednesday next following the second Tuesday in November;" which last amendment was adopted. On motion, the next section of the report was adopted as read. On motion, the third section was adopted as read. On motion, the fourth section was adopted as read. On motion, the fifth section was amended so as to read that "the Secretary be allowed $2,000 salary, and not more than $1,000 clerk hire; and that he devote his whole time to the work." On motion, the sixth and seventh sections were adopted as read. On motion, the report of the committee, as amended, was adopted as a whole.

J. W. Sanborn, in behalf of committee on Farmers' Institute meetings, presented the following report.

"Your committee to whom was committed the question of the expediency of holding Farmer's Institute meetings, respectfully report the following resolution:

Resolved, That for the promotion of the object for which the Board was instituted, and for the advancement of the agricultural interest of the State, that it is desirable and expedient to hold several Farmers' Institute meetings during the coming winter, at such points as local interests make most available; endeavoring to organize such meetings widely apart.

Resolved, That the Secretary be requested to notify the farming community, through the press, the desire of the Board to co-operate with those communities desiring its assistance in carrying forward a farmer's meeting; that the expenses of the board be defrayed from its treasury; the citizens of the place of meeting, furnishing a hall, warmed and lighted, free of expense to the Board.

Resolved, That the Secretary be requested to furnish printed bills for posting; that he arrange for the attendance of not less than three and no more than five members of the Board at said meetings, each of whom shall come prepared to give an address upon some one of the economic problems of the farm.

Resolved, That upon the approval of a reasonable bill of traveling expenses of attending members of the Board, by the Secretary and Chairman of the Board, the treasurer of the Board be instructed to pay such bills from any money in the treasury.

H. ESHBAUGH,
J. W. SANBORN,
R. W. GENTRY,
Committee.

Which substitute was adopted.

Moved that the question of holding a Farmers' Institute at Sedalia, next week, be left to the discretion of the Executive Committee. Moved, as a substitute, that the first institute be held at Independence, leaving the time to be determined by the Executive Committee.

Mr. Eshbaugh offered the following resolution:

"WHEREAS, We the members of the State Board of Agriculture, miss the familiar face of our friend and co-worker, Prof G. C. Swallow, who has long been an active member of this Board, a faithful teacher in the Agricultural College, and earnest worker in the State of Missouri in developing the agricultural interest and its science; therefore,

Resolved, That we, the said Board, regret his severance from the work of this Board and from the Agricultural College, and remember with pleasant recollection, the many valuable services rendered, and that our best wishes be tendered him in his future labors, wherever he may be located," which was seconded by Dr. Laws and adopted, and a copy ordered to be furnished Prof. Swallow and to the press of Columbia.

On motion of Dr. Laws, it was ordered that the Treasurer pay the expenses of members in attendance at this meeting.

On motion, the Board adjourned to 2:30 P. M.

EVENING SESSION.

Thursday Afternoon, 2:30 P. M.

Board called to order; President Walker in the chair.

Dr. Laws offered the following resolution, which was adopted:

"WHEREAS, The Board of Agriculture meets at long intervals, and has an Executive Committee, whose business it is to attend to the business of the Board in the intervals of these meetings, and it is important that the powers of this Executive Committee should be well understood by all the members of the Board; therefore

Resolved, That it is the sense of this Board of Agriculture that the Executive Committee is competent and is expected to exercise the full powers of the Board, subject only to the approval of the Board, to give its actions full legal validity, at each subsequent meeting."

Moved by H. Eshbaugh and seconded by Dr. Laws, to allow the Chair to cast an unanimous vote for Secretary, *vice* R. W. Gentry resigned. Carried.

Prof. J. W. Sanborn was named as Secretary.

Moved by Dr. Laws, and seconded by D. A. Ely, that the Chair cast an unanimous vote for Vice-President, vice Prof. Sanborn, resigned. Carried.

The Chair named H. Fshbaugh as Vice-President.

Moved by Prof. Sanborn that the Executive Committee be authorized to take the necessary steps for holding a reaper and mower trial some time during the year 1883.

On motion, the Board adjourned

R. W. GENTRY,
Secretary.

JOHN WALKER,
President.

THE BEST METHODS OF FATTENING CATTLE.

By Hon. John Walker.

This subject may be treated under two divisions:

First—Spring and summer feeding.

Second—Fall and winter feeding.

In discussing this subject, I find much that applies to the first division of the subject, applies with equal force to the second.

Under the first division I would recommend to begin the "handling" of the cattle by "roughing" them through the greater portion of the winter liberally on fresh stalk-fields, hay and corn fodder, commencing to feed corn in the spring about the 15th of March, feeding sparingly at first and increasing the amount gradually from day to day until a quantity somewhat less than full feed is attained, continuing to feed corn regularly, after turning on the grass, until about the 15th of May or until the grass has attained sufficient growth and solidity to afford fattening properties in ample quantity. The advantage of grain feeding in the spring consists in the fact that it prevents that shrinkage or loss in weight which is always experienced in changing suddenly from dry feed to the soft and succulent grass. Another material advantage derived from this method of spring feeding is that it enables the feeder to reach an earlier market than he otherwise could without adopting this system of feeding. The amount of corn thus fed, need not necessarily exceed fifteen bushels per head on an average. A small quantity of salt may be given occasionally with profit. It is very necessary that the cattle have free and easy access to an abundance of pure water, with shade sufficient to protect them from the sun's rays while reposing during the heat of summer. When cattle are turned on grass for the purpose of fattening, it is important that they have the "first run" of the pasture. Experience and observation satisfy me that they cannot be fattened on grass successfully in company with other animals, nor in pastures which have recently

been grazed by other stock, no difference how abundant the growth of the grass. I feel assured that following out the methods here suggested for the management of cattle during the spring and summer feeding cannot fail to secure the largest profit on the capital invested in stock-feed. The *time* and *place* of selling must be determined by the judgment of the feeder, which will be governed by the condition of the stock and the market demand.

FALL AND WINTER FATTENING.

Under the second division, I would recommend to commence feeding corn as early as the middle of September, while the cattle are yet running on the blue grass pasture. Beginning to feed green corn, cut just below the ear, feeding the fodder (or tops) along with the soft corn, and continuing to feed regularly, increasing the quantity slightly, from day to day, until the herd "is brought into full feed," carefully avoiding overfeeding or foundering, I would continue feeding on the grass until it ceased to afford a sufficient quantity of "roughness," at which time the cattle should be brought into the feed lot. This lot should be large enough to afford space for watering and feed troughs, and also abundant room for the cattle to lie down in without being compelled in the least to crowd each other. The ground selected for the feed-lot should be rolling or sloping enough to prevent standing pools of water and the accumulation of mud. Where circumstances will permit, a sheltered lot should be selected. Before removing the cattle from the pasture, see that this lot is well enclosed by a *good*, *strong fence*, sufficient to prevent the escaping of any of the herd. Gates should be erected to admit ingress and egress, and avoid inconvenience and the liability of any of the herd escaping, by making "gaps" in the fence. All causes of alarm or excitement among the herd should be guarded against as carefully as against escaping. The docility of disposition in cattle, and the perfect tranquility of a herd, while fattening, either in the feed-lot or pasture-field, are advantages that cannot be overestimated by the feeder. The lot should be well provided with good and convenient troughs, both for watering and feeding purposes. Without a *convenient* and *ample* supply of *pure* water, *success* in fattening cattle is impossible, and without the use of troughs, to prevent the wasting of food, when thrown on the ground, in winter feeding, *economy* is equally impossible.

I would recommend that a suitable lot adjoining the feed lot be provided so that if any of the cattle are found to be in "bad order," from any cause whatever, they may be easily and quietly removed from the herd, and properly treated. It will also serve a convenient purpose, should any of the cattle escape and miss their regular feeding, for only a short time. In such cases, care should be taken to guard against the danger of over-feeding, and this can only be accomplished by feeding such animals separately from the

herd, until that danger is passed. Every feeder should have his stock scales erected, so that weighing may be done easily and with the least possible excitement or disturbance in the herd. On driving into the feed lot for fattening, the entire herd should be weighed, (either separately or collectively), and weights preserved in a book kept for that purpose, and by occasionally weighing the herd and comparing the results, the feeder is enabled to determine the progress made accurately. For fattening purposes, corn is acknowledged to be the best grain. But a liberal supply of "roughness," such as hay, corn-fodder and straw, should always be kept on hand, and the cattle should have free access to it.

In feeding corn to cattle for fattening, I am decidedly in favor of having it shelled. I would reject the cob entirely, as food, either whole or crushed. My objections to feeding the cob under any circumstances is based on the injury it produces in the alimentary canal. On examining the cob, I find the inner point of each grain of corn rests in a cell which adheres to the cob after shelling, and extends to the pitch in the cob, terminating in a very hard and sharp point, nearly diamond shaped. This sharp pointed cell is so hard that it entirely resists the operation of the most improved corn and cob crushers; neither is it crushed by mastication when fed in the ear; consequently when swallowed in that condition it acts on the food receptacles only as an irritant, both in the stomach and intestines, causing the expulsion of the food long before the work of assimilation has been perfected. This is the principal reason why I would reject the cob as food. When not crushed it is difficult to masticate, and when crushed and fed in the form of cob-meal, it can only be claimed that it aids digestion by the *distention* that it produces. But the proper amount of "long feed" which should be given will produce this result without any of the injurious effects arising from feeding the cob. After reaching "full feed," I have found the best results from feeding shelled corn twice a day for five days each week, and for the remaining two days using a mixture of shelled corn, coarse corn meal, shipstuff and wheat bran—alternating in this manner regularly. I find this method of changing the feed beneficial. I mix the shelled corn with the ground feed, and use coarse corn meal instead of fine for the following reasons: When either corn meal or shipstuff is fed alone the cattle will eat it hurriedly, and a considerable portion of it will be formed into balls and swallowed; these balls will resist the action of the bile and gastric juice of the stomach, and retard the work of assimilation. I also find that by feeding corn meal or shipstuff alone, in addition to the foregoing objection, there is danger from too much concentrated food; but by adding the wheat bran the bulk or quantity is largely increased without concentration, and by adding the shelled corn mastication becomes necessary in eating the mixture; this excites the salivary

glands, and the saliva not only aids deglutition, but imparts sufficient moisture to prevent the meal and shipstuff from being formed into balls, and renders the mass digestible and easily assimilated. The proportions of the "mixed feed" might be varied occasionally as the judgment of the careful feeder might suggest. As in the summer feeding, a small quantity of salt once a week may be given profitably, and a small quantity of ashes might be occasionally mixed with the salt; this is very necessary when symptoms of acidity of the stomach are manifested; the alkali contained in the ashes will speedily neutralize the accidity. The herd should be examined carefully occasionally to ascertain if by chance some of the cattle might become infested with vermine; should vermine be found the application of either coal oil or a solution of carbolic acid will soon destroy them. A liberal supply of bedding, especially in stormy weather and when the lot is muddy, is imperatively necessary. A plan which I would recommend to secure this desirable object would be for the farmer, when he threshes grain in the fall, (if at all practicable), to stack the straw in the feed lot and enclose it in such a manner that the cattle could have access to it in the winter without tramping it under foot, and thus he would secure both food and bedding convenient, and at the same time secure a shelter from the storms of winter. It is important that the cattle be fed at regular intervals. They quickly learn *when* to look for their food; and if not fed at or near that time, they soon manifest the disappointment by their uneasy and restless movements. The loss sustained in a herd of cattle from this source is much greater than many feeders imagine. Another important matter in successful feeding is, not to change the herdsman or feeder if it can be avoided. Cattle, and especially fattening cattle, are naturally more suspicious of strangers and more easily excited by their presence than any other domestic animals; and I would advise that when a competent herdsman can be secured, one who is attentive and kind to the herd, that he be retained at almost any price; and *lastly*, I would recommend that the watchful eye of the owner be constantly kept, alike on the herdsman and the herd, strictly obeying the injunctions of Holy Writ: "Be thou *diligent* to know the state of thy flocks and *look well* to thy herds."

LONG-WOOL SHEEP—THEIR BREEDING AND POINTS OF VALUE.

BY R. M. BELL OF ILLINOIS.

In treating on long-wool sheep in this country it is understood to mean Cotswolds and Leicesters, since these two breeds represent the long-wool interests here. Of these two breeds the distinctive lines of breeding, although well enough defined in the books, are less apparent in the sheep themselves. They have been so interbred to correct certain supposed weaknesses in each breed that it is rare to find pure Cotswolds or pure Leicesters.

That there are pure-bred flocks of each is doubtless true; and it is to be hoped greater care will be taken to preserve and perpetuate these sheep than has been done for the last twenty years.

While it has been fortunes to Cotswold flock-masters that long wool has had so long and popular a run as it has had since the war, yet it has been unfortunate to the breeding and excellence, either as to the purity of breeding or the quality of the fleece or the mutton.

Such a charge five years ago would have been a joke. It has nevertheless been an apparent fact to those who merely looked on for many years, that the popularity of these sheep was against painstaking breeding in America. While fine wool and middle wool breeders of sheep were discriminated against, they were breeding to a type or standard closely defined and strenuously insisted upon.

Long-wool sheep allowed a looseness of definition and breeding which, in the end, has produced the very state of things predicted by us years ago. It has come by two mistakes: "Imported" has been taken for the highest excellence, because if a sheep came from England or Canada it was taken as evidence that it was standard in every essential; if, as most of them have been, so poor specimens that English and Canadian flock-masters have had no use for them, then they either sold them to Americans or the butchers.

Besides this mistake, our long-wool folks have taken anything with long wool on it as a Cotswold, until to-day, with the market against them, they open their eyes to find Cotswold wool so long and coarse and hairy as to be unfit for our uses, except in carpet manufacture. And while claimed to be

the wool and mutton breed of sheep of this country, so little attention has been given to their mutton qualities, other than size, that their claims, even to mutton, are likely to be superseded. To sum up the mistakes American long-wool men have fallen into, we would say, coarseness of fleece and mutton. They have had the popular run so long and undisputed that they have grown careless and have run their flocks out. This is not the case though with Leicester sheep. Their fleece far surpasses, in the pure-bred flocks, all other long wool in fineness and lustre. For this reason they have been used on the Cotswolds extensively. They are, however, a little less hardy under American careless ways of handling, and to some extent have been crossed with Cotswold to give them more hardiness and size.

It is not the intention of this paper, at all, to discourage the breeding of these two excellent breeds of sheep in this country. A man who is sick must know that he is sick before he can get well. When he knows he is sick he is ready to take medicine. We recognize the fact that the mutton breeds are the sheep for the highest conditions of agriculture. It is apparent that the fine wool breeds of sheep are giving place to the mutton breeds. Mutton does not receive the attention it should from our countrymen, either as an article of food or export. If we are wise we shall improve the chance we have to grow the mutton England needs and demands and is willing to pay for. If we do not somebody else is going to, and we shall have made a mistake. While the Downs are the *ne plus ultra* in mutton excellence, and are making their claims heard, and by the mistakes of long-wool breeders are taking the ground rapidly, it seems to us that for a time, certainly, Cotswold and Leicester sheep ought to be able to hold the place they have against every breed. Their wool must be refined either by abandoning the grades and coarser flocks to a Merino cross, or by selling them to the butchers. Selling them for mutton would break down our market at once. Raising carpet wools will not pay Americans, and is a shame to us; besides the few Cotswold flocks in this country that are breeding up to the standard are not patronized nor appreciated by flock-masters generally. The average Cotswold flock-master looks at size of carcass more than anything else, unless it is "size" of price. He will take a $10 scrub if his wool is long and his carcass ever so bad, so it is big, sooner than take the very finest and purest bred Cotswold in the world at the same price. It is time a change had come. The American Cotswold Association is in the right path. It has a register and standard of excellence and is doing good pioneer work on the good old missionary basis. Every long-wool man should connect himself with it by his money. That is the way to join an association or patronize a good cause—put your money, not a mere pittance to see if it is going to go, but all you have, if necessary to make it a success. Long-wool sheep men in this coun-

try have the money, and if they have the brains, which I candidly think they have, they are not going to lie still for the popular breeze to catch their sails again, but will look about and mend their weak places and meet the issues and demands of wool and mutton. If the fine wool is going to have the run, as it seems plain enough to everybody it is, it is for long-wool sheep to supply the mutton market, which is so inviting and promising. At the late St. Louis Fair were shown some of the finest Cotswolds we ever saw, and the standard of the Cotswold Association was applied to them by your Missouri expert, Mr. K. H. Allen, of O'Fallon, with much satisfaction to the exhibitors and credit to the Fair Association. The great and good State of Missouri is doing much towards sheep husbandry. You have noble workers in your State, and it is a matter of pride with us all that your State Board is moving in the front rank and stands on the top shelf. You have more broad-gauge, hard working, close thinking, big souled men, who are appreciating your situation and superior adaptation to sheep raising of all the breeds, than any State in the Union. The standards of excellence you are insisting upon and the harmony of your labors will bring you the rewards you are so modestly laboring for. I thank you, gentlemen, for the honor you bestow upon me, and regret that this paper is not a better one.

Yours, R. M. BELL.

ASSESSMENT FOR TAXES OF 1881 MADE AUGUST 1, 1880—PREPARED BY THE PRESIDENT OF THE BOARD, HON. JOHN WALKER.

	Valuation.	
	Personal property.	Real estate.
Real estate		$406,104,426
Horses, 667,102	$ 22,231,872 00	
Mules, 179,143	7,583,088 00	
Asses and jenets, 4,501	187,997 00	
Neat cattle, 1,946,288	22,181,795 00	
Sheep, 1,687,290	2,348,521 00	
Hogs, 3,647,048	6,068,645 00	
Other livestock, 70,490	185,484 00	
Money, bonds and notes	45,506,845 00	
Brokers and exchange dealers	1,745,536 00	
Corporate companies	8,202,796 00	
All other personal property	47,022,780 00	
Aggregate valuation of personal property		163,265,359
Assessment of railroad companies		30,309,878
Assessment of bridge companies		1,695,000
Assessment of telegraph companies		348,219
Total assesment for taxes of 1881		$601,722,883

ASSESSMENT FOR TAXES OF 1882—MADE JUNE 1, 1881.

	Valuation.	
	Personal property.	Real estate.
Real estate		$442,826,742 00
Horses, 673,276	$ 24,355,278 00	
Mules, 181,020	8,230,595 00	
Asses and jennets, 4,630	203,338 00	
Neat cattle, 2,042,160	25,256,176 00	
Sheep, 1,798,625	2,384,604 00	
Hogs, 2,878,134	5,724,445 00	
Other livestock, 9,637	193,263 00	
Money, bonds and notes	59,031,716 00	
Brokers and exchange dealers	1,015,129 00	
Corporate companies	2,316,782 00	
All other personal property	42,102,650 00	
Aggregate valuation of personal property		170,813,976 00
Assessment of railroad companies		33,373,739 46
Assessment of bridge companies		1,910,000 00
Assessment of telegraph companies		342,785 40
Total assessment for taxes of 1882		$649,267,242 86

NOTE.—The following articles, "The Classfication of Wools and their Market Values;" the address of W. E. Gowdy, and the "Report of the Public Shearing," at Sedalia, are taken from the Wool Growers' Association report.

Secretary Gentry, who is president of the Association, desired the use of matter from this report, and the above named articles have been selected according to that desire

THE CLASSIFICATION OF WOOLS AND THEIR MARKET VALUES.

BY H. T. BROWN OF BOSTON, MASS.

Mr. President and Gentlemen:

In considering the classification or grading of wool, as it is termed in the Eastern markets, let us first look into the causes that led such classification. Fifty years ago, when wool growing and manufacturing in the United States, as compared with to-day, may be said to have been in their infancy it was the custom, among the majority of the large manufacturers, to go into the country about shearing time, and to purchase from the farmer, either directly or through their agents, enough wool to supply their mills for the entire year. In so doing, they accumulated a great variety of wools, among them some grades not adapted to their wants and which they were obliged to sell. At that time, before the railroads had formed so complete a network over the Western States, and before every village had its newspaper with daily or weekly market reports from Eastern cities—and, I may say, before the now irrepressible Wool Circular reached the hands of almost every grower throughout the country—the wool buyer was able to take advantage of the ignorance of the farmer, and to buy his wool at prices frequently fifteen to twenty cents per pound below the values ruling in the East. In fact, there were instances where washed wools, bought in Ohio at forty cents per pound, were sold in the East at sixty-five cents per pound, and that was done during a period when there was no material change in the market. Such a state of affairs, however, could not go on without an end. The

growth of the country brought increased facilities for distributing information and commercial reports; the wool circulars spread over the land like a cloud of locusts, and from their periodical quotations of prices the farmers were apprised of the values of their staple. We admit that the farmer is as liberal as any other citizen of the country; at the same time, he is quite as determined to get value received for his product, if he knows it; and this fact was probably demonstrated by a decreased margin in the price of wool between the West and the East—the difference, in a great measure, being to the advantage of the grower.

Manufacturers, finding that the success of their mills no longer depended upon the profits to be made out of their wools, but that competition necessitated a closer application to specials styles of goods, were compelled to buy only such grades as were adapted to their particular kind of fabrics: hence arose the importance and advantage of commission houses, to receive and assort the wools to that end.

The classification of wools consists in assorting the fleeces, as they come from the sacks, the different grades (each fleece being left intact), in order to offer to the manufacturer, as nearly as possible, the particular quality of wool he may require. By obtaining just the wool he wants, and no more. the consumer can afford to pay its full intrinsic value, while each grade goes into the place to which it is adapted, and thus nets a better result to the owner than by any other method.

In handling the wools of Missouri and adjoining States the following classification is usually made: First, as to *quality*, of which there are four grades—Fine; No. 1 Medium; No. 2, or Low Medium; Coarse and Common. Secondly, as to *staple* or length of fabric, namely, Fine Delaine; No. 1 Combing; Medium Combing; Coarse, or Low Combing.

Fine wools, or X and above, as they are classed in the washed fleece of Michigan, etc., are from such sheep as will grade three-quarters blood Merino and above; the second cross of a thoroughbred Merino ram on a pure Southdown ewe will yield this quality. The fleeces are usually graded into two classes, according to condition of grease and dirt, namely, Light Fine. being such as will lose in cleansing 63 to 66 per cent.; and Heavy Fine, which includes bucks, heavy weathers, and ewes that will shrink 70 to 78 per cent. These wools are used in the manufacture of flannels, overcoatings, cassimeres, and a variety of the finer qualities of smooth finished goods.

No. 1 Medium, the next in order of quality, is the half-blood Merino fleece, arived at most directly by the first cross of a pure Merino ram on a pure Southdown ewe. The wool is soft, and works freely, with little waste: it is adapted to the same class of goods as those just mentioned, but of a more medium quality and is particularly suitable for hosiery and knit goods.

This wool is also frequently used in the manufacture of fine heavy cloths, as a warp pool, with the higher grade as wool or filling, the latter being brought on to the surface of the fabric, and a fine finish thus obtained.

No. 2, or Low Medium, is a more difficult grade to classify as to blood. It is generally the result of mixed breeding, with more or less want of purety in both sire and dam, being 1-4 to 3-8-blood Merino. It is not uncommon that sheep of a lighter grade, where they have been neglected in food and care, will yield fleeces that have to be thrown with this class. The wool is used in the production of rough-faced goods, such as Cheviots, etc., and is sometimes worked, in connection with cotton, to make the satinets and jeans.

Coarse and Common.—The mongrel sheep, the Cotswold, Leicester, or whatever breed it may be of coarse-wooled sheep, that has been neglected by its owner, poorly fed, ill cared for or fleece grown, finds but little use for its wool outside of blankets and carpets. The fibre is wiry and hairy, being deficient in the beard which constitutes the most important feature in the spinning qualities of all wools.

The other grades in our classification are the staple wools, Delaine and Combing, which, in quality, coincide with the so-called clothing grades just enumerated. Let it be the result of carefully breeding the Merino, or a series of crosses of the Merino on the long-wooled sheep, the fleece must have a uniformity of length to the staple, the latter must be elastic and sound throughout its entire growth, and particularly in these wools should the fleece be free from all extraneous matter, such as dung, heavy sweat locks, burrs, straw, etc.

The peculiar method of working consists in passing the wool through a machine called a comb; hence the term *combing*, as applied to these grades. This process, in result, is similar to the manipulation of a handful of cleansed wool with an ordinary comb: the fibres are all brought out, so that they lie parallel, and, when twisted, form a strong, hard and brilliant yarn. On the comb will be found an accumulation of the short fibres, from half an inch to one inch in length, which are called *noils*. These noils the manufacturer is obliged to sell, as they are not adapted to his particular class of goods. It is evident, therefore, that fleeces which are not of sufficient length, or that are at all week in fibre, or that, while long enough on the shoulder and back, yet run short and fribby on the belly, are not suitable to the classification of Delaine and Combing wools.

There is still another impediment that applies particularly to fine, unwashed wools, and which, to a certain extent, stands in the way of their being sold as fine Delaine, even should they have the other necessary qualifications. The bellies and skirts of the blooded Merino sheep are so impregnated with the natural oil, sweat, etc., that it is impossible to scour them white.

The importance of this drawback lies in the fact that many of the mills using this class of wool manufacture it into yarn, which is sold to other mills that cannot afford the additional expensive machinery; there the yarn must be white and perfect, ready for any use to which it may be applied.

Having given the leading characteristics of Combing wools, there remain to be mentioned the requisite length of staple, and some of their uses. Fine Delaine wool should be, on the shoulder 3 1-4 to 3 1-2 inches in length, and not less than 3 inches on the belly. These wools go principally into the fine, black worsted suitings for men's wear, particularly into spring and summer fabrics. In this connection I would mention, that, for light weight summer goods, a finer wool is required than is necessary for the heavy winter cloths. No. 1 Combing requires a uniform length of 4 inches or more; which, combined with the other qualifications, produces a wool well adapted to shawls, heavy worsted suitings, and fine ladies' dress goods. Medium Combing, in quality, corresponds with No. 2 clothing; its length averages 4 1-2 inches or over; its use, the better class of alpacas and worsted braids. The yarn is sometimes used sparingly in cassimeres, to give a worsted effect to the pattern of the goods. Coarse or low Combing is mostly obtained from the pure or nearly pure Costwold, Leicester, and other long-wooled sheep. It has entered but to a limited extent into the wants of manufacturers during the past few years, and for its consumption has been almost entirely confined to cheap alpacas, ladies' dress goods, and braids.

The second question assigned to me by your Executive Committee is, "Marketable Value of Wools," by which, I take it, is implied the comparative value of the different grades of Missouri wools as resulting in the returns per sheep to the grower. First, let us notice the method pursued by the manufacturer in making his purchases. Given a pile of wool of the required quality, length and strength, the all-important question to consider is, what will it lose in cleansing? The consumer can afford to pay a certain price for his scoured wool; and, starting from that basis, he calculates the probable shrinkage in order to arrive at its value in the grease—that is, in its natural unwashed state. In such estimates of shrinkage, the experienced manufacturer will approximate very closely to the actual result; but he is not infallible, and serious mistakes in judgment are sometimes made; hence it is often the case that before buying a large pile of wool he will wish to test sample bags.

Taking an average of the last six months of 1881 as a basis for the comparative values, in the order of scoured value, shrinkage and grease value, the following result is obtained: Light fine, scoured, 77c; shrinkage, 65 per cent.; grease value, 27c. No. 1 Medium, scoured, 66c; shrinkage, 55 per cent.; grease 30c. No. 2 Medium, scoured, 54c; shrinkage, 50 per cent.;

grease, 27c. Coarse, scoured, 41c; shrinkage, 45 per cent.; grease, 22½c. Heavy Fine, scoured, 75c; shrinkage, 74 per cent.; grease value, 19½c. It will be noticed that the cleansed value of Heavy Fine is 2c below that of Light Fine, while the wools are of the same quality. This discrepancy is accounted for by the fact that bucks' and heavy ewes' fleeces require a greater expense in sorting and cleansing; also the heavy sweat locks and fribs cannot be scoured white, which depreciates the average value of the fleece.

The next point to consider is the comparative gross returns obtained per fleece of the different grades of wool. Taking an estimate of the average weights of the fleeces, as nearly as they can be approximated, we find the result to be as follows: Light Fine—say 10 lbs.—at 27c, $2.70 to the fleece; No. 1 Medium, 8 lbs., at 30c., $2.40; No. 2 Medium, 7 lbs., at 27c, $1.89; Coarse, 7 lbs., at 22½c., $1.57½.

In regard to the marketable value of Delaine and Combing wools, referring to Fine Delaine, the defects already mentioned are a serious drawback. To induce the manufacturer to buy such wools for Delaine, the grower must remove those objectionable features before doing up the fleeces, and let them be sold with his heavy. By so doing the Delaine fleeces would probably bring 2 to 4c per pound more. From 1 to 1½ lbs, would usually cover the weight of such skirting, which, if sold at 19½c, and the remainder of the fleece at 30c, the result would be $2.84 per fleece against $2.70, if sold as clothing, or about 1½c per pound gain. Before taking this step, however, the owner should be well assured that the fleece has the other necessary qualifications of Delaine wool. The other grades of Combing are more free from these fribby locks, and have usually commanded, for Medium, 2 to 3c, and for Coarse, 2 to 4c more than for the corresponding clothing grades; although during the past year the limited call for Medium and Low wools has restricted the sale of Combing grades, and the margin above clothing prices has hardly been sufficient to cover the expense of grading them out.

In considering the comparative values of the different grades of sheep from a wool standpoint, it is clearly evident that the most profitable to the grower are the fine-wool sheep, either the high grade Merino or the pure blood; and, furthermore, for the past few years there has been an increasing tendency towards the production of a finer class of goods. The prosperity of the country has created a demand for better clothing; and so long as we can look forward to continued success in our great agricultural and industrial enterprises, there is little prospect of a retrograde movement towards cheaper fabrics. No clearer evidence of the prevailing demand for better woolens is shown than in the case of one of the largest corporations in New England, whose machinery is adapted to, and whose consumption consists in, the working of medium and low-combing wools. The prosperity of this mill, in past

years, has been so great that its shares of stock were worth, a year ago, about threefold their par value; whereas the decline in prices of low-grade goods during the past twelve months has depreciated the stock from that point more than 35 per cent.

In closing, I would say, emphatically, to those of you who have been breeding the coarser wools, or who have been negligent as to the quality of your flocks, lose no time in raising the standard of your wool; cull out the defective sheep, replace them with full bloods or high grades, and use the thoroughbred Merino rams for the increase.

Missouri has had the name of being a coarse wool State. Not more than two months ago a manufacturer called on us for fine wool. We showed him a pile of fine, unwashed Missouri, when he remarked that he had not known before any fine wools were grown in that State. Within recent years a strong effort has been made, by a comparatively strong number of growers, to establish fine-wooled sheep in Missouri. They have made good progress; but, gentlemen, the work is only begun; and let me encourage you all to use your best endeavors to make your State what it is capable of being—equal to any in the production of fine, deep-grown staple, that it may take its proper place in the foremost rank of wool-growing districts of the world

ADDRESS OF W. E. GOWDY.

Mr. President and Gentlemen:

It seems to me that we have before us, in this subject of the "defects of Missouri wools," one of the most important questions for discussion before the convention, and while they are not numerous yet they are of vital importance to the wool-growers of this State, and in presenting my views on this question, I wish simply to say, they are not biased or prejudiced by any one person, but are the results of several years of observation in your State, and are backed by an experience of years in the factory. The three principal defects are blood, burs and brashy ends—all, you will perceive, due to management and consequently easy of reparation. I read an article in a certain agricultural journal entitled Blood versus Corn, and to many it would seem the author's points were well made. He claimed that there was more in the crib than in the blood. But my own experience and observation has been that good blood with a small corn crib is of more value than a large crib and little blood. This is constantly proved in comparing the cost of fattening a thoroughbred or grade Short-horn, Devon, Hereford or Galloway steer and a common scrub. This will apply to all animals as well. You will perceive that I consider the most important remedy to be the infusion of good blood, for it is a fact, a very good grade of Combing or Delaine wool can be grown by using a thoroughbred Merino ram on a native, large-bodied, straight-wooled Missouri ewe; a still better wool by using the Merino ram on the large-bodied half-blood lambs, giving us the three principal essentials for a profitable wool sheep, viz., a large body, close fleece and a long staple—consequently giving wool of fine quality and value per head. And it seems to me we cannot too forcibly impress on our minds the necessity and the value of pure-bred males for breeding purposes at the head of every band of ewes. It is a notorious fact that there are many who claim to sell registered rams and whose sheep are not eligible to register. At one time being shown a pretty sample of wool I claimed that there was a trace of Cotswold blood in the wool. The gentleman said I was mistaken, he claiming that the gentleman who raised the animal had bred Merino sheep for twenty years. I told him it was not a pure Merino wool. Two years afterwards the breeder entered some of these rams at a State fair for competition, and the committee

ruled them out as not thoroughbred, and consequently not eligible to register or to compete with registered sheep. (I will say here he was not a resident of Missouri.) I think if the gentlemen have done as they promised or expected to do, I can show you some Missouri lambs (got by Missouri rams, I mean rams owned by Missourians), that for wool cannot be surpassed in the United States for either combing, delaine or clothing purposes. But I find that these gentlemen have not done as they promised. The second principal defect is a serious one in some parts of the State—the cockle burr—yet it is due more to mismanagement than anything else, and is easy of remedy, as can be proven by a visit to several sheep farms where a cockle burr cannot be found. Yet this little burr costs the State thousands of dollars by a decreased value of from three to ten cents per pound on burry wool. It seems to me one of the best investments a wool-grower can make, is to employ a man or his boys to pull burrs or destroy the burrs on his farm. A gentleman told me his weaned lambs turned in the cornfield eat off all the growing burrs. The third defect—or the brashy end—is due in part to the blood, using inferior rams, insufficient shelter from storms, deficient or poor feed, and largely to old or run-down sheep: and it seems to me it is sufficient in naming the cause of this defect to at once suggest the remedy. These three defects are the principal. Too much feed or too much corn is the cause of defective wool. I am aware, from discussion with numerous wool-growers, that there is a wide difference of opinion on this matter. But, gentlemen, if 1 1-2 bushels of corn or its equivalent fed to one hundred head of sheep will make healthy sheep, healthy wool, keep both growing nicely, then all that is fed more than this is virtually thrown away. If it goes into yolk, as it does, your sheep will retain more dirt and dust, and, of course, the increased weight by dirt and grease makes more pounds of something to the head, but it is not wool, and what is gained in weight you lose in cents per pound. You ask, how is this? I answer to the first, why is too much corn injurious? In one hundred pounds of wool there are—rams excepted—from 30 or 35 pounds of pure wool; the rest is dirt, grease or yolk. From actual tests this 62 to 70 pounds of dirt contain from 5 to 7 pounds of potash. This is from Australian or Cape of Good Hope and other foreign wools, and I presume, if actual tests were made from some of the heavy western wools, the results would be a larger per centage; and as potash is destructive to wool, you can at once see the result.

REPORT OF THE PUBLIC SHEARING

AT SICHER'S PARK, SEDALIA, MISSOURI, APRIL 6, 1882, UNDER THE DIRECTION OF THE MISSOURI STATE WOOL-GROWERS' ASSOCIATION.

Owner.	Breed.	Sex.	Number.	Age, years.	Weight with wool on.	Length of Wool.			Age of fleece, days.	Fleece, w't.. lb. oz.	Per cent. of wool to net carcass.	Grade of wool.
						Shoulder.	Back.	Belly.				
R. W. Gentry	Merino	Ram.	26	1	79½	3½	3	3½	372	13.14	21.14	Fine.
"	"	"	40	2	90	3¾	3¾	4	364	16.08	22.45	Unwashed.
"	"	"	504	3	132½	3½	3	3½	364	24.08	22.68	"
"	"	Ewe.	694	4	76	3½	3½	3½	364	25.05	25.23	"
"	"	"	669	4	94½	3	3½	3½	368	13.09	16.75	"
"	"	"	174	1	60	3	2¾	3	365	12.02	25.32	"
"	"	"	Unregistered	2	58	3½	3½	3½	365	6.15	13.58	"
Maj. Wm. Gentry	Cotswold	Ram.	1	2	176	7	7	6	336	11.05	6.87	Coarse comb.
"	"	"	2	1	111½	8½	8½	5½	365	10.04	10.12	"
"	"	Ewe.	1	1	111½	.....	.....	.....	.....	11.01	11.01	"
"	Southdown	Ram.	Tom Cloney	1	152	4½	4	3½	365	9.00	6.29	Medium.
Samuel Jewett	Merino	Ewe.	69	3	92	3	3	3½	354	17.12	18.18	Fine unwashed.
"	"	Ram.	527	3	149	3½	3	3½	355	35.08	31.27	"
"	"	"	120	2	151½	3½	3½	3½	341	28.04	22.92	"
"	"	Ewe.	554	3	92	3½	3½	3½	364	23.01	33.45	"
"	"	"	803	1	49	3	3	3	375	13.07	37.85	"
"	"	"	664	2	79¾	3½	3½	3½	355	12.05	18.51	"
"	"	Ram.	700	1	116	3	2¾	2¾	371	26.04	29.24	"
"	"	"	Rip. 90	2	135	3	3	3½	371	29.00	27.35	"
"	"	Ewe	.....	6	104	3½	3	3	363	11.14½	12.92	"
R. T. McCulley & Bro.	"	Ram.	44	3	121½	3	3	3½	363	29.07	31.90	"
"	"	"	150	2	133½	3½	3½	3	364	28.13	27.52	"

REPORT OF THE PUBLIC SHEARING—Continued.

Owner.	Breed.	Sex.	Number.	Age, years	Weight with wool on.	Length of Wool.			Age of fleece, day.	Fleece, w't.. lb. oz.	Per cent of wool to net carcass	Grade of wool.
						Shoulder	Back	Belly				
R. T. McCulley & Bro.	Merino	Ewe	93	3	100	3½	3½	3½	363	26.08	36.05	Fine unwashed.
"	"	"	Hammond	5	99	3½	3	3	345	13.12	16.13	"
"	"	"	61	2	94	3½	3	3	365	17.05	21.82	"
"	"	"	10	3	84	3½	3	3½	346	11.09	15.96	"
Hary McCullough	"	Ram	48	1	74	3	3	3½	371	14.06	24.10	"
"	"	Ram	21	3	75	3½	3½	3½	364	14.12	24.47	"
"	"	"	30	2	81½	3½	3	3½	363	18.04	28.74	"
"	"	Ram	52	4	135	2½	2½	2½	363	24.03	21.82	"
"	"	Ewe		1	66	3½	3	3	365	11.07	20.96	"
J. W. Cole	Cotswold	Ram	82	1	131	12	12	9½	365	14.05	12.27	Coarse comb.
E. H. Rogers	Merino, high grade	"	75	4	132	3½	3	3	359	19.09	17.39	"
"	" "	Ewe	0	1	73½	4½	4½	4	379	12.05	20.50	"
"	" "	"	332	6	117	3½	3½	3½	371	21.10	22.67	Fine delaine.
"	" "	"	10	1	92	3½	3	3	406	17.06	23.28	Fine unwashed.
Mrs. C. Pugsley	" "	Ram	142	1	102	3½	3½	4	395	22.01	27.60	"
H. V. Pugsley	" "	"	179	1	75½	3½	3	3	395	18.08	32.45	"
Mrs. C. Pugsley	" "	"	46	3	158½	2½	2½	2½	365	32.13	26.04	"
"	" "	Ewe	35	3	95	3½	3½	3½	364	17.12	22.97	"
"	" "	Ram	107	2	130	3½	3½	3½	363	26.11	25.58	"
S. K. Hallam	Southdown	"	40	2	155	2½	2½	3	316	5.08	3.67	Medium.
D. W. McQuitty	Merino	"	160	1	95	2½	2½	2½	341	17.08	22.58	Fine unwashed.
"	"	"	529	3	150	3½	3	3	351	31.00	26.04	"
"	"	Ewe	552	2	81	3½	3½	3½	364	14.10	23.03	Light fine.

REPORT OF THE SCOURING OF TWENTY-NINE FLEECES OF WOOL.

SENT BY THE MISSOURI WOOL-GROWER'S ASSOCIATION TO WALTER BROWN & CO., FROM SEDALIA, APRIL 6, 1882.

Owner.	Breed.	Sex.	No.	Unwashed.		Scoured.	Shrink.	Scoured	Av. value per lb. Unwashed.	Total Amount Proceeds.
				Sorts.	Lbs. Oz.	Lbs. Oz.	Per cent.	Value.		
R. W. Gentry.....	Merino...	Ram.	40	3	1 03½	06½	.....	87	.....	35 36-100
				4	11 14½	3 13	.....	83	.....	3 16 59-100
				5	1 10	09	.....	79	.....	44 37-100
				6	1 05	08	.....	67½	.....	33 76-100
				Seedy	09	02¾	.....	68	.....	11 69-100
					16 09½	5 06¼	67 3-5		26 56-100	4 41 77-100
R. W. Gentry.....	Merino...	Ewe.	Unregistered.	2	1 03	07½	.....	95	.....	44 47-100
				3	3 03½	1 06	.....	92	.....	1 26 50-100
				4	10	04½	.....	86	.....	24 18-100
				5	11½	04½	.....	77	.....	21 64-100
				6	10½	03¼	.....	67½	.....	13 71-100
				Seedy.....	08½	03¾	.....	70	.....	16 39-100
					6 15	2 13½	59		35 52-100	2 46 89-100
R. W. Gentry.....	Merino...	Ewe.	694	2	2 03	10½	.....	91	.....	58 22-100
				3	5 11	1 12	.....	83	.....	1 45 04-100
				4	1 14	08½	.....	78	.....	41 39-100
				5	3 11½	12¾	.....	75	.....	58 67-100
				6	1 11	08	.....	67	.....	33-44-100
				Seedy.....	13½	04½	.....	68	.....	19 12-100
					14 00	4 08	67 9-10		25 42-100	3 55 88-100

REPORT OF THE SCOURING OF TWENTY-NINE FLEECE OF WOOL—Continued.

Owner.	Breed.	Sex.	No.	Unwashed.		Scoured	Shrink.	Scoured	Av. value per lb. Unwashed.	Total amount proceeds.
				Sorts.	Lbs. Oz.	Lbs. Oz.	Per cent.	Value.		
Maj. Wm. Gentry.	Cotswold.	Ram.	1	Long 6....	7 00	4 11½	....	48	.....	2 26 50-100
				Long D...	3 02½	2 01	....	44	.....	90 75-100
				Short	1 00	08	.....	35	.....	17 44-100
					11 02½	7 04½	34 7-10		29 52-100	3 34 69-100
Maj. Wm. Gentry..	Cotswold.	Ram.	2	Long B...	4 13½	2 15½	.....	54	.....	1 60 31-100
				Long E...	3 14½	2 06½	.....	48	.....	1 14 75-100
				Short	1 05	10½	....	35	.....	22 34 100
					10 01	6 00	40 2-5		39 44-100	2 97 40-100
R.T.McCulley&Bro	Merino...	Ewe.	9	3	7 06½	2 04	.....	85	.....	1 91 16-100
				4	6 00	1 12	.....	79	.....	1 38 04-100
				5	5 07	1 09	.....	76	.....	1 18 75-400
				6	3 14½	1 03	.....	66	.....	78 37-100
				Seedy	14½	04½	.....	63	.....	17 68-100
				Fribbs	2 11	13	.....	43	.....	34 93-100
					26 05½	7 13½	70 3-10		20 92-100	5 78 95-100
R.T.McCulley&Bro	....	Ewe.	Hammonds...	3	7 04½	2 01	.....	88	.....	1 81 50-100
				4	1 14½	08	.....	84	.....	12
				5	2 06	13	.....	81	.....	65 78-100
				6	1 02½	08	.....	68	.....	34
				Seedy	07½	02	.....	75	.....	09 36-100
					13 02½	4 00	69 7-10		26 72-100	3 32 64-100

REPORT OF THE SCOURING OF TWENTY-NINE FLEECES OF WOOL.

SENT BY THE MISSOURI WOOL-GROWER'S ASSOCIATION TO WALTER BROWN & CO., FROM SEDALIA, APRIL 6, 1882.

Owner.	Breed.	Sex.	No.	Unwashed.		Scoured.	Shrink.	Scoured	Av. value per lb. Unwashed.	Total Amount Proceeds.
				Sorts.	Lbs. Oz.	Lbs. Oz.	Per cent.	Value.		
R. W. Gentry.....	Merino...	Ram.	40	3	1 03½	06½	.....	87	.....	35 36-100
				4	11 14½	3 13	.....	83	.....	3 16 59-100
				5	1 10	09	.....	79	.....	44 37-100
				6	1 05	08	.....	67½	.....	33 76-100
				Seedy	09	02¾	.....	68	.....	11 69-100
					16 09½	5 06½	67 3-5		26 56-100	4 41 77-100
R. W. Gentry.....	Merino...	Ewe.	Unregistered.	2	1 03	07½	.....	95	.....	44 47-100
				3	3 03¾	1 06	.....	92	.....	1 26 50-100
				4	10	04½	.....	86	.....	24 18-100
				5	11½	04½	.....	77	.....	21 64-100
				6	10½	03½	.....	67½	.....	13 71-100
				Seedy.....	08½	03¾	.....	70	.....	16 39-100
					6 15	2 13½	59		35 52-100	2 46 89-100
R. W. Gentry.....	Merino...	Ewe.	694	2	2 03	10½	.....	91	.....	58 22-100
				3	5 11	1 12	.....	83	.....	1 45 04-100
				4	1 14	08½	.....	78	.....	41 39-100
				5	3 11½	12¾	.....	75	.....	58 67-100
				6	1 11	08	.....	67	.....	33-44-100
				Seedy.....	13½	04½	.....	68	.....	19 12-100
					14 00	4 08	67 9-10		25 42-100	3 55 88-100

REPORT OF THE SCOURING OF TWENTY-NINE FLEECE OF WOOL—Continued.

Owner.	Breed.	Sex.	No.	Unwashed.		Scoured	Shrink.	Scoured	Av. value per lb. Unwashed.	Total amount proceeds.
				Sorts.	Lbs. Oz.	Lbs. Oz.	Per cent.	Value.		
D. McQuitty.....	Merino ..	Ewe .	552	3	5 08	1 15½	.....	88	.....	1 73 25-100
				4	3 14½	1 06½	.....	83	.....	1 16 25-100
				5	2 10	15	.....	75	.....	70 20-100
				6	1 11	12	.....	66	.....	49 50-100
					13 10½	5 01	62 9-10		29 92-100	4 09 50-100
D. McQuitty.....	Merino ..	Ram .	160	4	7 09	2 04	.....	84	.....	1 89
				5	7 06½	2 08	.....	79	.....	1 97 20-100
				6	1 07½	10½	.....	70	.....	45 88-100
					16 07	5 06½	67 1-5		26 24-100	4 32 08-100
Samuel Jewitt.....	Merino ..	Ewe .	664	3	1 00½	06½	.....	88	.....	35 75-100
				4	7 00½	2 11	.....	84	.....	2 25 75-100
				5	1 15	11½	.....	77	.....	56 31-100
				6	1 07	08½	.....	68	.....	36 12-100
				Seedy.....	08	03	.....	68	.....	12 75-100
					11 15	4 08½	62 1-10		32 32-100	3 65 68-100
Samuel Jewett.....	Merino ..	Ram .	120	2	1 15½	09	.....	92	.....	51 75-100
				3	6 09	1 11	.....	85	.....	1 43 37-100
				4	6 07½	1 15	....	78	.....	1 51 12-100
				5	7 13½	2 00	.....	74	.....	1 48
				6	4 13	1 09	.....	67	.....	1 04 50-100
					27 09½	7 12	71 9-10		21 60-100	5 98 74-100

				4	5 10	2 02½	.....	80	.....	1 72 50-100
				5	3 08	1 06½	.....	79	.....	1 10 92-100
				6	1 08½	10	.....	67½	.....	42 20-100
				Seedy	1 01½	06	.....	70	.....	26 22-100
				Fribbs	1 00	07	.....	45	.....	19 67-100
					17 05½	6 10½	61 3-5		29 12-100	5 15 40-100
H. V. Pugsley.....	Merino ..	Ram .	46	3	4 02½	1 02	.....	92	.....	1 03 59-100
				4	11 11	3 07	.....	84	.....	2 88 75-100
				5	9 11	3 05	.....	81	.....	2 68 18-100
				6	4 07½	1 15	.....	70	.....	1 35 47-100
				Fribbs	1 15	15	.....	50	.....	46 87-100
					31 15	10 12	66 2-5		26 24-100	8 42 77-100
H. V. Pugsley.....	Merino ..	Ram .	179	4	5 02	1 07	.....	84	.....	1 20 75-100
				5	5 15	1 11½	.....	81	.....	1 39 15-100
				6	3 11	1 05	.....	68	.....	89 25-100
				Seedy	1 11½	05½	.....	75	.....	25 25-100
				Fribbs	1 05	13	.....	50	.....	40 62-100
					17 12½	5 10	68 2-5		23 52-100	4 15 51-100
H. V. Pugsley.....	Merino ..	Ram .	107	3	3 04	1 01	.....	85	.....	90 27-100
				4	8 14	3 02¾	.....	86	.....	2 53 25-100
				5	8 11	3 00	.....	77	.....	2 31
				6	4 14	2 02	.....	67½	.....	1 43 48-100
				Seedy	13	03¾	.....	70	.....	16 39-100
					26 08	9 09½	63 4-5		27 68-100	7 34 39-100
Maj. Wm. Gentry..	Cotswold.	Ewe .	1	Long G...	4 14½	3 01	.....	48	.....	1 47
				Long D...	4 10½	2 11½	.....	44	....	1 18 94-100
				Shorts	1 07¾	11½	.....	35	.....	24 52-100
					11 00½	6 07½	41 2-5		26 24-100	2 90 46-100

REPORT OF THE SCOURING OF TWENTY-NINE FLEECE OF WOOL—Continued.

Owner.	Breed.	Sex.	No.	Unwashed.		Scoured	Shrink.	Scoured	Av. value per lb. Unwashed.	Total amount proceeds.
				Sorts.	Lbs. Oz.	Lbs. Oz.	Per cent.	Value.		
D. McQuitty.....	Merino ..	Ewe .	552	3	5 08	1 15½	.....	88	.....	1 73 25-100
				4	3 14¼	1 06¾	.....	83	.....	1 16 25-100
				5	2 10	15	.....	75	.....	70 20-100
				6	1 11	12	.....	66	.....	49 50-100
					13 10¼	5 01	62 9-10		29 92-100	4 09 50-100
D. McQuitty.....	Merino ..	Ram .	160	4	7 09	2 04	.....	84	.....	1 89
				5	7 06½	2 08	.....	79	.....	1 97 20-100
				6	1 07½	10¾	.....	70	.....	45 88-100
					16 07	5 06½	67 1-5		26 24-100	4 32 08-100
Samuel Jewitt.....	Merino ..	Ewe .	664	3	1 00¾	06½	.....	88	.....	35 75-100
				4	7 00½	2 11	.....	84	.....	2 25 75-100
				5	1 15	11½	.....	77	.....	55 31-100
				6	1 07	08¼	.....	68	.....	36 12-100
				Seedy.....	08	03	.....	68	.....	12 75-100
					11 15	4 08½	62 1-10		32 32-100	3 65 68-100
Samuel Jewett.....	Merino ..	Ram .	120	2	1 15½	09	.....	92	.....	51 75-100
				3	6 09	1 11	.....	85	.....	1 43 37-100
				4	6 07½	1 15	.....	78	.....	1 51 12-100
				5	7 13½	2 00	.....	74	.....	1 48
				6	4 13	1 09	.....	67	.....	1 04 50-100
					27 09½	7 12	71 9-10		21 60-100	5 98 74-100

H. V. Pugsley.....	Merino ..	Ewe .	35	3	4 09½	1 10½	.....	87	.....	1 43 89-100
				4	5 10	2 02½	.....	80	.....	1 72 50-100
				5	3 08	1 06½	.....	79	.....	1 10 92-100
				6	1 08½	10	.....	67½	.....	42 20-100
				Seedy	1 01½	06	.....	70	.....	26 22-100
				Fribbs	1 00	07	.....	45	.....	19 67-100
					17 05½	6 10½	61 3-5		29 12-100	5 15 40-100
H. V. Pugsley.....	Merino ..	Ram .	46	3	4 02½	1 02	.....	92	.....	1 03 59-100
				4	11 11	3 07	.....	84	.....	2 88 75-100
				5	9 11	3 05	.....	81	.....	2 68 18-100
				6	4 07½	1 15	.....	70	.....	1 35 47-100
				Fribbs	1 15	15	.....	50	.....	46 87-100
					31 15	10 12	66 2-5		26 24-100	8 42 77-100
H. V. Pugsley.....	Merino ..	Ram .	179	4	5 02	1 07	.....	84	.....	1 20 75-100
				5	5 15	1 11½	.....	81	.....	1 39 15-100
				6	3 11	1 05	.....	68	.....	89 25-100
				Seedy	1 11½	05½	.....	75	.....	25 25-100
				Fribbs	1 05	13	.....	50	.....	40 62-100
					17 12½	5 10	68 2-5		23 52-100	4 15 51-100
H. V. Pugsley.....	Merino ..	Ram .	107	3	3 04	1 01	.....	85	.....	90 27-100
				4	8 14	3 02½	.....	80	.....	2 53 25-100
				5	8 11	3 00	.....	77	.....	2 31
				6	4 14	2 02	.....	67½	.....	1 43 48-100
				Seedy	13	03½	.....	70	.....	16 39-100
					26 08	9 09½	63 4-5		27 68-100	7 34 39-100
Maj. Wm. Gentry..	Cotswold.	Ewe .	1	Long G...	4 14½	3 01	.....	48	.....	1 47
				Long D...	4 10½	2 11½	.....	44	....	1 18 94-100
				Shorts	1 07½	11½	.....	35	.....	24 52-100
					11 00½	6 07½	41 2-5		26 24-100	2 90 46-100

REPORT OF THE SCOURING OF TWENTY-NINE FLEECES OF WOOL—Continued.

Owner.	Breed.	Sex.	No.	Unwashed.		Scoured	Shrink.	Scoured	Av. value per lb. Unwashed.	Total amount proceeds.
				Sorts.	Lbs. Oz.	Lbs. Oz.	Per cent.	Value.		
Maj. Wm. Gentry..	Southdown	Ram .	Tom Cloney..	L. 5.	3 07½	1 11½	.....	67	.....	1 14 67-100
				L. 6.....	2 02½	1 00½	.....	60	.....	61 87-100
				S. 5.....	1 06½	09	.....	65	.....	36 54-100
				S. 6.....	1 12½	14	.....	55	.....	48 02-100
					8 13	4 03	52½		29 60-100	2 61 10-100
E. H. Rodgers.....	Merino...	Ewe .	332	3	6 10	2 03	.....	87	.....	1 90 05-100
				4	9 09	3 06½	.....	83	.....	2 83 61-100
				5	2 10	14½	.....	79	.....	70 25-100
				6	2 05½	15½	.....	67½	.....	64 20-100
					21 01½	7 07½	64 7-10		28 80-100	6 08 11-100
E. H. Rodgers.....	Merino...	Ewe .	10	3	5 00	1 09½	.....	92	.....	1 46 62-100
				4	8 02	2 09	.....	86	.....	2 20 37-100
				5	1 15	09½	.....	85	.....	51 77-100
				6	2 01	13	.....	68	.....	55 25-100
					17 02	5 09½	67 4-5		27 68-100	4 74 01-100
E. H. Rodgers.....	Merino...	Ewe .	0	2	1 08½	10	.....	96	.....	60
				3	4 08½	1 13	.....	94	.....	1 70 37-100
				4	1 09½	09½	.....	90	.....	53 39-100
				5	1 08½	09	.....	85	.....	47 79-100
				6	2 05	13½	.....	70	.....	58 99-100
				Seedy.....	08	03	.....	80	.....	15
					12 00	4 10	61½		33 79-100	4 05 54-100

				3	3 11¾	1 10½	.....	94	.....	1 55 68-100
				4	1 01¾	07½	.....	90	.....	40 78-100
				5	1 14	11	.....	81	.....	55 66-100
				6	14	04	.....	73	.....	18 24-100
				Seedy.....	05½	02½	.....	80	.....	11 25-100
					9 11¾	4 00	59		28 80-100	2 81 61-100
E. H. Rodgers.....	Merino...	Ram .	75	3	6 04	2 02½	.....	85	.....	1 83 19-000
				4	5 01¾	1 12½	.....	80	.....	1 42 50-100
				5	5 06	2 01	.....	75	.....	1 54 44-100
				6	2 02½	1 00½	....	67	.....	68 97-100
					18 14¼	7 00½	62 8-10		28 96-100	5 49 10-100
R.T.McCulley& Bro	Merino...	Ewe .	10	3	6 10	2 08	.....	92	..... .	2 30
				4	1 12½	11½	.....	84	.....	60 37-100
				5	1 10½	10	.....	85	.....	53 10-100
				6	12	04	.....	70	.....	17 50-100
				Seedy.....	08½	03	.....	70	.....	13 12-100
					11 05½	4 04½	62 3-10		32 80-100	3 74 09-100
R.T.McCulley& Bro	Merino...	Ram .	150	2	1 10	07½	.....	91	.....	41 18-100
				3	6 00	1 12	.....	83	.....	1 45 04-100
				4	5 04	1 10½	.....	78	.....	1 29 18-100
				5	7 03	2 01¾	.....	73	.....	1 53 90-100
				6	4 01½	1 02	.....	66	.....	74 25-100
				Fribbs	3 13½	1 01	.....	44	.....	43 52-100
					28 00	8 02½	70 7-10		20 96-100	5 87 07-100
R.T.McCulley& Bro	Merino...	Ram .	3	4	10 09	3 03	.....	80	.....	2 55
				5	6 14½	2 05½	.....	75	.....	1 75 50-100
				6	6 03	2 01	.....	67	.....	1 37 94-100
				Fribbs	3 10	1 03½	.....	43	.....	52 26-100
					27 04½	8 13	67 7-10		22 72-100	6 20 70-100

ROLL OF MEMBERS AND REPORTS OF FLOCKS.

Name.	Address.	No. Sheep	Grade.	Value.	Clip.	Price net.	Sold.
Allen, K. H.	O'Fallon	120	Cotswolds	$2,400	1,200		
Atkinson, W. M.	Boonville	80	Grade Merinos	400	544		Wool-growers' Exchange.
Arnold, D.	Walker	136	Merinos and Cotswolds	1,000	963	21	Sold at home.
Armstrong, G. R.	Schell City	50	Cotswolds	2,500	525	22	Sold at home.
Andrews, Geo.	Golden City						
Amsbury, L. N.	Lamine	302	Merinos and Cotswolds	1,100	2,090	23	Price, Marmaduke & Co.
Boardman, H. J.	Independence	200	Merinos	6,800		23¾	Walter Brown & Co.
Bennett, Lewis	Lee's Summit	200	Cotswolds	1,200	1,156	21	Sold at home.
Battaile, W. W.	Blackburn						
Banks, J. S.	Sedalia						
Booth, C. C. & Sons	Miami	300	Merinos	2,400	2,925	21	Sold at home.
Buford, P. C.	Longwood						
Bruns, W. H.	Concordia	80	Grade Cotswolds	320	600	21½	Price, Marmaduke & Co.
Blood, A. J.	Carthage	400	Merinos		4,000		J. D. Whitham.
Brown, G. S.	Walker	250	Merinos	3,000	2,000	23	Sold at home.
Barber, N.	Little Osage						
Bigelow, S. S.	Nevada						
Bright, E. C.	Sheldon						
Beavers, C. S.	Carthage	400	Grade Cotswolds	1,200	1,600	23	Sold at home.
Colman, N. J.	St. Louis						
Chilton, V. T.	Smithton	408	Merinos and Southdowns	1,632	2,336	26½	Gray, Gould, Dewey & Co.
Carlton, J. M.	Corder						
Cole, J. W.	Sedalia	70	Cotswolds	1,050	700		
Clark, G. W.	Appleton City						
Chamberlain, T. F.	Appleton City						
*Cass, N. S.	Lamar						
Cavin, O.	Walker	600	Grade Merinos	1,800	2,800		
Clark, Josephus	Rockville						
Coulter, J. H.	Elmwood	66	Cotswolds	264	514	22	Sold at home.
DeBerry, B. F.	Smithville						
*Dewease, P. L.	*Sedalia						
Darr, W. Z.	Carrollton	1,475	Merinos and Grades	4,425	6,509	22½	Sold at home.
Eichelberger, A.	[illegible]	335	Merinos	1,675	2,710	22	Sold at home.

Elliott, John	Green Ridge		Grade Cotswolds	1,450	300	22	Sold at home.
Ewing, M	Walker	325	Cotswolds	1,450		21¼	Sold at home.
Elmore, Oliver	Longwood						
Finch, W. R	Corder						
Frost, J	Humansville						
Fuller, S	Nevada						
Fryback, B	Lincoln						
Gentry, Maj. Wm	Sedalia	740	Grade Merino and Cotswolds	3,700	4,440	25	Sold at home.
Gentry, R. W	Sedalia	900	Merinos	15,000	7,000	27	Walter Brown & Co
Gentry, N. H	Sedalia						
Gentry, W. M	Sedalia	800	Merinos and Southdowns	8,000	6,528	25	Sold at home.
Gentry, Joshua	Dresden	350	Mixed	1,500	2,700	23	Sold at home.
Gentry, T. H	Smithton						
Graves, O. T	Schell City	1,300	Medium	4,500	5,724	22¾	Sold at home.
Glover, W. B	Malta Bend						
Gill, J. C	Leroy						
Goble, I. L	Butler	250	Grade Cotswolds	625	1,100	21	Sold at home.
Gordon, W. S	Walker						
Gray, J. G	Nevada						
Hunter, Jacob S	Riverview						
Higgins, J. C	Houstonia						
Hilt, J. S	Blackburn						
Hayman, F. C	Longwood	293	Grade Oxfords		1,300	23	Sold at home.
Hickox, T. V	Boonville						
Hand, H. T	Taborville						
Hall, Wm	Walker						
Houston, T. F	Houstonia						
Hallam, S. K	Windsor						
Harris, E. H	Pilot Grove						
Harris, Dr. N. W.	Harriston						
Jackson, J. M	Hughesville	225	Grade Southdowns	1,000	1,100	22½	Sold at home.
Jewett, L	Independence						
Lientz, M. P	Rocheport	220	Merinos	1,330	1,346		Walter Brown & Co.
Lowry, Wm	Hughesville						
Leonard, C. E	Bell Air						
Lakin, John	Sedalia						
Linn, H. W	Nevada						
Leonard, A	Mount Leonard						
Leonard, W. H	Mount Leonard						
Mathews, A. B	Kansas City						
Martin, G. T	Elmwood						

ROLL OF MEMBERS AND REPORTS OF FLOCKS—Continued.

Name.	Address.	No. Sheep	Grade.	Value.	Clip.	Price net.	Sold.
McCollugh, H.....	Fayette	225	Merinos	$ 3 ,500	2,946	22½	Walter Brown & Co.
McCulley R.T.&Bro	Lee's Summit.....	400	Merinos	8,000	4,016	23½	Walter Brown & Co.
McQuitty, D. W...	Rocheport	124	Merinos	2,500	1,493	25	Sold at home.
Mather, B. F.....	Ionia City.....	200	Grade Cotswolds.....	600	1.093	22¾	Sold at home.
McCullough, A. L.	Estill	226	Merinos	2,000	1,902	22½	Sold at home.
Morrow, C. A.....	Golden City.....	.....	.....	.....	.....	.....	
McArthur, A.....	Boonville	206	Grade Merinos.....	824	1,319	.....	Wool-growers' Exchange, Phila.
Mitzler, F. W	Pilot Grove.....	.....	.....	.....	.....	.....	
Monroe, W. M.....	Tipton	102	Cotswolds and Merinos.....	357	612	21	Sold at home.
Neale, B. M.... ..	Blackburn.....	.....	.....	.....	.....	.....	
Nesbit, C. W.....	Appleton City.....	.....	.....	.....	.....	.....	
Ormrod, Geo.....	New Palestine.....	.....	.....	.....	.....	.....	
Powell, Jacob & Sons	Independence	.....	.....	.....	.....	.....	
Porter, Benjamin..	Beaman	150	Cotswolds and Merinos.....	750	900	22½	Sold at home.
Pugsley, H. V.....	Plattsburg	315	Merinos.....	12,000	4,700	24	
Pugsley, Mrs. C....	Independence	460	Merinos....	20,000	3,500	.....	Justice, Bateman & Co.
Pratt, J.....	Hudson	400	Medium.....	2,000	2,000	23½	Sold at home.
Rhodes, Robert....	Alma	.....	.....	.....	.....	.....	
Reynolds, C. B....	Sedalia.....	.....	.....	.....	.....	.....	
Richards, Fred.....	Lamar	.....	.....	.....	.....	.....	
Rodgers, E. H.....	Bell Air.....	1,100	Grades and Merinos..... ...	.....	8,000	26½	
Roberts, S. W.....	Pleasant Green.....	.....	.....	.....	.....	.....	
Smiley, W. A.....	Boonville	50	Grade Merinos.....	.....	*360	.....	Wool-growers' Exchange.
Snow, Orla.....	Atlanta	.....	....	...	.....	.....	
Sneed, J. M.....	Sedalia.....	285	Southdowns	1,425	1,710	25	Sold at home.
Snell, E. P.....	Paris.....	.....	.....	.....	.....	.....	
Scott, H. B.....	Sedalia.....	.....	....	.....	.....	.....	
Scott, J. E.....	Houstonia.....	425	Merino and grades.....	1,275	2,125	23½	Sold at home.
Spear, M. M.....	Lamar	.....	.....	.....	.....	.....	
Tinsley, T. S.....	Buffalo.....	.....	....	.....	.....	.....	
Taylor, C. C. & Sons	Nevada	450	Merinos, grade.....	1,800	1,400	22	Sold at home.
Taylor, Isaac P....	Blackburn.....	.....	.....	.....	.....	.....	
Thompson, J. Q...	Walker.....	117	Cotswolds and Natives.....	320	557	18½	Sold at home.

Thompson, S. W..	Palestine.....	.....	.....	.....	.....	.....	
Wellman, H. B....	East Lynne.....	.....	.....	.....	.....	.....	
Williamson, G. T..	Windsor	.....	.....	.....	.....	.....	
Williams, N. W....	Pilot Grove.....	100 140	Merinos..... Cotswolds	400 560	1,680	21@22	Sold at home.
Yantis, W. L.....	Booneville	.....	.....	.....	.....	.....	
Woods, J. S.....	Sedalia.....	.....	.....	.....	.....	.....	
Wasson, John.....	Cane Hill.....	.....	.....	.....	.....	.....	
Whitney, J. L.....	Smithton.....	.....	.....	.....	.....	.....	
Wallace, G. H.....	Fayette	.....	.....	.....	.....	.....	

*Washed.

AGRICULTURAL COLLEGE LANDS.

(From Missouri Statesman, Oct. 7, 1881.)

As some wrong impressions prevail in regard to the recent sale of a portion of these lands, the object of this article is to state the facts substantially as they exist:

The lands lying in five counties in the southern part of the State, bordering on Arkansas, have been sold, conveyed aud paid for as follows:

	Acres.	Price.
Howell county	74,047.61	$104,051 05
Douglas county	44,301.68	64,542 36
Ozark county	11,523.11	16,553 04
Oregon county	7,832.26	9,790 32
Texas county	9,817.45	13,392 04
No. ares sold	147,522.11 Amount paid	$208,328 81
Average price per acre		$1 41

We obtain the above figures from Robt. L. Todd, Esq., Secretary of the Board of Curators of the State University.

These are a portion of the lands granted by the United States Government to the State of Missouri, under the act of Congress, approved July 2, 1862. Under this act, Missouri was compelled to select the quantity of lands within her own boundaries, to which she was entitled, from the United States lands remaining unsold at that time, which perhaps did not exceed 2,000,000 acres. Of course they were generally rough lands lying in remote sections of the State, and up to this time, very little has been realized out of them.

Under the act of the General Assembly of the State, providing for the location of the Agricultural and Mechanical College, and which was drawn up by Major Rollins, there is a section most wisely providing that all these lands, before being put upon the market, should be carefully inspected and valued, by a commission of three persons appointed for this purpose. The late Judge James Harris, an experienced County Surveyor, a man of business

and a fine judge of lands, headed this commission and aided in discharging this duty.

It is perhaps this section of the law, requiring these lands so to be valued, that will probably in the end enable the Curators to realize a handsome sum out of them. The Board have steadily held to the policy of not selling these lands below their valuation, and they have refused all offers to purchase any considerable quantity of them, for any sum under their valuation.

At one time a bill was introduced into the General Assembly, offering to sell these lands by counties, to the State at their valuation, but it was promptly rejected.

The lands referred to in the five counties above named, were sold through the agency of Messrs. Donnell, Lawson & Simpson, of New York City, who had been appointed Commissioners by the Board of Curators, with authority to dispose of them with the approval and aid of Pres. S. S. Laws, and the Executive Committee of the Board of Curators, composed of Major Rollins, Elder J. K. Rogers and Mr. John S. Clarkson. An option was given in June last to Col. George H. Nettleton, President of the Kansas City, Fort Scott and Memphis Railroad Company, to purchase the land in the five counties named, at their valuation, giving him forty days within which to examine them, and either to accept or to decline taking them. About the expiration of the time Col. Nettleton concluded to take the lands at their valuation; deeds have been executed and delivered to him by th President of the Board of Curators, according to the requirement of the statutes of the State, the purchase money ($208,328.81), has been paid by Col. Nettleton to Mr. R. B. Price, Treasurer of the Board of Curators, and the matter thus far closed.

It is believed that this is a good and judicious sale for the Agricultural College; and that it is also a judicious purchase by Col. Nettleton for the railroad company with which he is associated, and which is engaged in building a railroad from Kansas City, through the counties of Southwestern Missouri and Northeastern Arkansas, to the city of Memphis, Tenn., and which we are assured will be completed within the next two years.

It may be well tc state that under the law, the money arising from the sale of these lands is an educational fund, dedicated exclusively, and for no other purpose, to the education of the young men and women of Missouri, and of other States, who may enter the Agricultural Department, or any of the departments of the State University at Columbia, or of the Mining Schoo at Rolla.

It is also not to be forgotten that under the act of Congress of July 2, 1862, making this large grant of land to the States, there were certain conditions attached, and which were required to be assented to by the Legisla-

tures of the different States before they could avail themselves of the benefit of the act. Among these conditions were the following:

1st. If any portion of the fund arising from the sales of these lands, was either lost or diminished, the State is bound to make it good.

2d. No portion of said fund, nor the interest thereon, shall ever be applied directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings.

3d. No State, while in a condition of rebellion or insurrection against the Government of the United States, shall be entitled to the benefit of this act.

There were other conditions in the law, but the above are the principal.

Missouri, by a joint resolution ot the Senate and House of Representatives of her General Assembly, adopted unanimously on March 17, 1863, accepted the terms of the law of Congress and received the lands donated "with all the limitations, conditions and restrictions therein contained, and the faith of the State of Missouri is hereby pledged to the faithful performance of the trust hereby created."

Thus far, none of these obligations of the State have been met or fulfilled, but have remained a dead letter upon the statute book. In the act of the General Assembly, approved February 24, 1870, providing for the location of the Agricultural College, a sum of money, at least equivalent to one hundred thousand do lars, was required to be paid by the County of Boone, in order to purchase the required lands for a site for the College and for other necessary purposes These requirements were promptly and faithfully complied with by Boone County—the farm furnished and the money paid—and since that time the institution has been utterly neglected and forgotten, so far as the obligations of the State to do her part is concerned. It is to be hoped that more liberal and enlightened policies will hereafter be adopted by the State in regard to the Agricultural Department of the institution.

In regard to the sale of the lands, the facts are properly presented above. It has been a fair, open, honest, business transaction, conducted without expense to the State or to the fund of the Agricultural College. It has required time and labor, but these have been given and performed by those who feel a deep interest in the cause of education, and in the grand success of the University and all of its Departments.

MEETING OF THE BOARD OF AGRICULTURE,

AT

INDEPENDENCE, FRIDAY AND SATURDAY, DECEMBER 29TH AND 30TH.

FRIDAY, December 29th, 10 A. M.

A public meeting of the Board was held at this place for the discussion of farm topics.

Mr. Fairchild Dowd, of the Board, called the meeting to order and proceeded to state the objects of its inauguration.

The purposes in view were to collect and dissiminate through these meetings and the press facts that bear directly on farm problems.

Col. N. J. Coleman followed in advocacy of these meetings. He believed they would have an important influence. Other States about us were holding them and we must not fall behind, as we surely shall, unless we do something to stimulate our agricultural interests. Unless we keep step to the movements about us, it will be "poor old Missouri" until we "shuffle off this mortal coil."

The acting Secretary explained the intentions of the Board.

The determination of the Board was to hold several of these sessions in various sections of the State, to discuss those practical problems that bear directly upon the economy of farm operations.

While it is the intention to have specialists present to impart valuable information on the topics discussed, yet it is believed that the stimulus imparted to renewed and more skillful methods will be the best good accomplished. It is not the knowledge received, but that applied that is effective. It is often more the want of action than of information that constitutes our weak point.

SMALL FRUITS.

BY J. C. EVANS.

Very few notes were taken of this talk. Mr. Evans expected to write out his remarks in compliance with a request from me. As such a paper has failed to reach me in season for publication, I can only record a few facts brought out during a debate that followed his talk. He said that "strawberries are not a success with me one year in ten when grown in the ordinary way. Irrigation never failed to insure a crop. Subsoiling accomplished the same purpose in part by holding the moisture of the soil during drought. Mulching aids and I sometimes resort to this practice; raspberries proved to be successful; black cap is one of the best varieties; I plant in rows six feet wide and one every two and one-half feet in row. Mr. ——— Ragan made some interesting remarks regarding small fruits. A paper expected from him has failed to arrive; he recorded his success with cherries for the market; he ships in six States; blackberries he found his most profitable berry; the Snider is a good berry; the Wilson I throw away; breaking up grass land I find is followed by too many grubs for strawberries; I have heard salt recommended to kill grubs, but it is liable to kill plant as well as worm.

Question by Mr. ———. What cherries do you recommend?

Mr. Ragan. Early Richmond. Mayduke and sweet cherries are too likely to have trees die and the business prove a failure.

Question by Mr. Dowd of Mr. Evans. Is it best to cut back the raspberry in the fall?

Mr. Evans. I never knew cutting back but resulted injuriously at this season. He cut back in the spring.

Question by Mr. Dowd. Does mulching in fall or covering with straw between rows prove beneficial?

Mr. Evans. I protect with straw often in winter and mulch in summer.

AFTERNOON SESSION.

Mayor Peacock was introduced by the Chairman, to give an address of welcome. In a few brief remarks he reviewed the position of the farming industry, the importance of its methods; and closed by saying that it was the permanent industry of the world.

The Chairman, M. F. Dowd, responded briefly for the Board.

He enlarged upon the remark of Mayor Peacock that farming is the basis of all success. Upon its prosperity rests the activities of all other business. The prosperity of farming in its turn depended upon the intelligence of the husbandman.

Education of the farmer was becoming of more and more apparent importance.

STOCK FEEDING.

BY MR. A. B. MATTHEWS.

I am not a speech maker, yet a man who has the privilege of living in as grand a beef-producing State as Missouri should ever be willing to say a word in behalf of beef cattle. Situated as we are, fifteen hundred miles from the sea-board, it is desirable that we should concentrate our grain into beef, pork, mutton, cheese butter and wool, in order that our products will bear transportation.

Considering all the surroundings at the present time, the majority of Missouri farmers succeed better in converting their products into beef, they are thus enabled to market in this concentrated form very much of the products of the farm that would otherwise be of little or no value. While the growing and feeding of beef cattle is, as a rule, a profitable business, very much depends on the breed of cattle. While I am an earnest advocate of a particular breed, I will not here introduce a comparison of the improved breeds. It is sufficient to say that Missouri would be millions of dollars richer if all the beef cattle within her border were either Short-horns, Herefords or Polled cattle. What we want is more good cattle and fewer *scrubs*. In no domestic animal does blood "tell" quicker than in a feeding steer.

But breeders and feeders in good cattle often make the very common mistake of thinking fat beef is invariably good beef. They often seem to forget that it is juicy *flesh* and not simply *tallow* we want on our tables. The man who feeds a steer that is covered over with great patches of fat between the hide and the flesh is simply wasting feed to produce an article that is only valuable when converted into rendered tallow. What we want then is to produce flesh and not tallow.

How, you ask, is the best way to do this? This, of course, is a broad question and I am aware at the outset, my answer will be very incomplete, both for want of time as well as ability to answer as it should be answered. While in Scotland last winter, I visited several successful feeders, some of whom had fed animals that had won the highest honors at their great Smith-

field shows. *Invariably* these feeders stated, "we want to commence with the calf and its mother; we feed the mother with such food as conduces to the largest flow of rich milk; as soon as the calf is old enough to eat well, it is fed with a small quantity of crushed oats and oil meal. The calf in this manner is grown into a large, fleshy as well as a fat calf. (I would here add in passing that you can grow more *flesh* on the calf while it is running with its mother than you can ever grow in the same time on the same animal ever afterward.) The calf having been taught to eat, it can at the proper time be weaned without being reduced in flesh.

After the calf is thus weaned, the successful Scotch feeder always attempts to hold the "calf-flesh." If this is done, the animal is always good, juicy beef, even if the feeder is not successful in making a show-animal. How different this mode of treatment is compared with the very common practice of feeding our calves on buttermilk, and driving them off to hunt their living on a sun-burned pasture when they bawl for a change. When this animal has become two or three years old, having been starved through the winters and poorly summered, it is seen and purchased by some farmer who has more corn than "cattle-sense," and placed in the feed lot. The farmer seems to think because there is room for improvement he will reap an immediate reward. He does not count on the length of time that it will require for this poor animal to "start." He also fails to remember that his steer has lost that which corn alone will never replace—I mean the "calf-flesh."

This brings me to state that American feeders make a great mistake in failing to furnish their feeding animals with a variety of food adapted to the various wants of their natures. Corn is an excellent food to produce animal heat and fat but it is a poor food to form flesh. We in Missouri are blessed with a soil that will grow everything in the highest perfection that is best adapted to making beef, while it is probable that labor is too high to grow root crops as the English and Scotch do, yet we can grow what is equally as good, and I believe better, viz.: Clover and sweet corn fodder, out of which we can make ensilage. All these, along with ground corn and a little oil meal, oats and straw, make a feed adapted to all the demands of nature in the feeding steer. Each succeeding year America is being called upon to furnish beef to England, and the demand for a better quality is more than keeping pace with the increased demand for quantity. While you hear much said about the English being prejudiced against buying American beef, this is very largely in the imagination of newspaper writers. English consumers buy beef on it merits, and to call it American beef brings to the mind of the Englishman our grand free country with its broad acres and cattle upon a thousand hills. Let us then press forward in the good work of breed-

ing better and feeding better beef cattle, and by all means let us get rid of the "scrubs."

The above cut is a true representation of a round steak and two chuck steaks from a two-year-old Polled steer, fed near Aberdeen, Scotland. In passing through the market house at Aberdeen, my attention was directed to this carcass of beef by seeing the remarkable "marbled" appearance of this cut. Upon examination I found very little tallow on the outside of the carcass, but the flesh and tallow were completely intermingled, making it what we all prize "juicy beef." Upon enquiry, I found the excellence of this beef was attributed both to the breed and the feeding of the animal. It is impossible to produce such beef by feeding a "scrub." It is equally as impossible to produce such beef with any single kind of food.

Mr. Powell. When would you wean a calf ?

Mr. Mathews. When three or four weeks old.

Mr. Powell. I would wean when three or four days old. I have found calves when weaned gnawing bark and other materials, and have given them whatever of rough food that they would eat.

Mr. Mathews. The Scotch, among whom I have been, did not give the calves roughness until three or four weeks old. I think the trouble with Mr. Powell's calves is lack of something that the mother's milk furnishes.

Mr. Sanborn. Are turnips, as you seem to indicate, a necessity for quality in flesh?

Mr. Mathews. No, not a necessity, but we cannot make the best beef from corn alone; we do not want all fat, but flesh well streaked in. We want some flesh forming food; and if we can get it from other sources that will answer.

I think that ensilage is a subject that deserves investigation. I think it is likely to revolutionize the Western system of feeding.

Mr. ———. Do you know of any one feeding ensilage in the West!

Mr. Mathews. Yes. My brother in Kansas is now feeding it, and has an animal so fat that he has discontinued the food to some extent.

Mr. Sanborn. I recently met a man in Iowa who had fed it two years with much satisfaction.

Mr. Dowd. I doubt whether early sowing of turnips is for the best. I think they are not so sweet when sown early.

Mr. Sanborn. In accurate experiments at the N. H. Agricultural College, in feeding for several years, the various root crops to steers for beef and to cows for milk and butter, first, I have found that the feeding of any of the roots, one-half bushel per steer of 1,000 pounds per day, decreased the amount of other food eaten, and usually increased the gain per day. This was due to the fact that when roots were given, more food was consumed in total. It required about six pounds of turnips or mangel wurzels, and less of carrots to replace one pound of hay. Considering the cost of fitting, cutting and carrying to stock, I do not regard the exchange an economic one. With cows, carrots had proved decidedly a better root than turnips or mangels for butter in its general appearance and in quantity. Mangel wurzels decreased the amount of butter received from a given amount of milk, and only very slightly increased the milk flow.

Col. Adams. I find hay and corn to be very valuable foods. I like clover or hay very much. I have frequently received gains of 100 pounds per month with my fattening steers. The practice of selling steers at 1,200 pounds weight is all wrong; they are then just in good shape to feed; we sell too young.

Mr. Sanborn. What is the cost of a pound of growth with a fattening steer?

Col. Adams. I do not know; I have used twenty pounds of hay and one-third of a bushel of corn per day. I have used corn fodder in case of necessity. I soaked corn last winter and got more gain than from dry corn.

LEGISLATION FOR FARMERS.

This subject was introduced by Mr. Dowd in an informal way. He compared the work being done in other States, by State aid, to Boards of Agriculture and to Agricultural Colleges, with that being done in Missouri, to the disadvantage of the latter State. He regarded the farmers as blamable in this matter. Agriculture demands the fostering influence of legislative aid; such aid greatly stimulated the agriculture of other States. Missouri cannot safely allow surrounding States to achieve a higher type of farming. She would suffer thereby.

Mr. Sanborn, in answer to a call, gave some account of the condition of the Agricultural College farm, representing it to be a farm of 640 acres, containing about 200 acres of tillage land, including the Horticultural Department, the balance being pasturage and wood land. There is a large, fine house upon it, but in other buildings, it is sadly deficient, likewise in personal property, it is very poor. This state of affairs, I trust, will shortly be improved upon by the liberality of the State. The United States have given land that will return a good permanent fund. Boone county has given the farm, but the State has done nothing that I am aware of. It is intended to make it an Experiment Station, in the interest of the practical farmer, if aid enables.

Messrs. Evans, Ragan, and others, expressed the opinion that the farm should be fully equipped, in order that it may fulfil its mission, and believed that farmers were to blame that the college farm was not in good working order by State assistance.

Adjourned to .

EVENING SESSION.

At 7 P. M. the meeting was called to order. The night n nfavorable, the audience was very limited in number.

Adjourned to 9 A. M., Saturday, the 30th.

SECOND DAY'S PROCEEDINGS.

SATURDAY, December 30, 1882.

The meeting was called to order by Mr. Dowd. The Chairman then called upon Secretary Sanborn to open a discussion on some practical farm question.

Mr. Sanborn said that he was not expecting to introduce a subject for discussion, but would suggest that seed breeding was one of the weakest points in skillful agriculture. The seed bounded the hopibilities of the plant; and the plant was the basis of the life of our domestic animals, and of man himself. For these reasons he regarded the seed and its breeding as a paramount importance; yet more energy and skill were devoted to the breeding of animals. By a system of winnowing and sifting, we could not only select the largest, but the densest seeds. Experiments had shown that such seeds are more vigorous and productive than small seeds, or seeds of low, specific quality. Maj. Hallett, of England, had, by careful selection, bred what he termed "Pedigree seed." He had increased the lenth of head of wheat and the number of kernels per head very greatly.

In the animal kingdom, it is usual to avoid in-and-in breeding. The great Darwin, and after him, Prof. Beal, had been attracted to the relation of in breeding on the vitality and prolificacy of seed, as manifested in the plant it gives. The results had shown that seeds of one variety grown under dissimilar conditions, when crossed were more vigorous. Corn could be very easily crossed. The largest crop of corn, for the acre, grown, that had ever come to his attention, was from the first cross of two similar varieties of corn. A few thoughts were expressed in relation to tillage. For corn, frequent and not deep tillage was recommended in time of drought. This conserved the moisture of the soil, acting as mulch to retard evaporation by breaking up capillarily to some material extent. The experiments of Stockbridge and Sturtevant, indicate that tillage prevents evaporation of water rather than acting as aiding the absorbing capacity of the soil.

Mr. Powell related that his father used the small seed on the end of the year. He held that such seed shed its pollen later, and thus fertilized late plants or ears.

Mr. Alexander then gave a few suggestions on wheat culture. He said that he never failed in wheat culture when it was well managed. He plows early, would prefer to lose a corn crop rather than have his wheat field illy fitted. Plows in June, and even in May, and tills occasionally and thoroughly. Nature may give a good crop but it is uncertain; good management assures

us of a good crop. He believed in smaller corn and nearer together in the rows.

Mr. Powell. Cribbing corn green, is a prolific cause of poor seed, and is a great mistake. I prefer small corn nearer together; I plant three and one-half feet each way between the rows, putting three stalks in the hill. I prefer arranging the rows three feet two inches wide, but it is difficult to get a two rowed machine less than three and one-half feet wide. Few calculate the difference it makes in the acre yield in number of plants when planted at varying widths. Deep culture is his great desire. Eight inches to ten being better than less. If we plow deep, we need never fail on corn in Missouri. He gives his corn ground a most thorough fit, freeing it most completely and deeply.

The Chairman then announced that he would give an address upon corn culture.

CORN CULTURE IN THE WEST.

BY M. FAIRCHILD DOWD.

In corn culture I have the practical experience and observation of nearly twenty years. In 1863, my father moved by wagon from Pulaski county, Indiana, to Kansas. Kansas is noted for almost everything that all the other States combined are, and one other, that of "Drouthy Kansas." When we first commenced farming in that State, it was a looked-for event for every third year to be a failure in all kinds of crops—especially the corn crop. In 1864, my father planted 60 acres of corn; the first 30 acres were plowed and harrowed down, furrowed out and planted; a heavy rock was then dragged over the rows to cover the corn. The season was getting late, and father concluded we would not have time to get in the other 30 acres in this way; and the idea was suggested that a shorter method might be employed, and accordingly the corn was dropped in every third or fourth furrow and the nesuccieng furrow thrown into it, leaving the corn planted very deep. This was followed up with the harrow and the ground was left as level as possible. The early season was a very wet one, and we were not able to cultivate the last planted until after wheat harvest, and by that time the corn was higher than a horse's back, making it impossible to cultivate it. We did cultivate part of it once, however, and this part so cultivated one time yielded about one-third more than that not cultivated at all; while that that was never cultivated made a yield of 41 bushels to the acre. From and after wheat harvest it remained very dry, and very little corn was raised in the county in which we lived (Miami). I give this to show two things: First, that it is no detriment to corn to be planted a little late if it is planted deep enough; and I think it unsafe to plant corn before the 15th of April; would prefer after that time, as a rule, and plant fully seven inches deep; and secondly, to show that the lower the ground is the more moisture it will retain, and that the stirring is no detriment but a benefit if left level. In 1869 there was another short year for corn. The season was very dry, and about the middle of June much of the corn in the neighborhood had begun to burn, and farmers

who had resided in the county (Allen) for several years turned their horses to grass and went into their corn with the hoe, and advised father to do likewise; but our corn was not burning (we had plowed up the ground at a depth of eight inches and planted the corn as deep as the planter would go). but the weather was very hot and dry. We continued to cultivate and allow the cultivator to run as deep as the ground had been stirred previous to the planting of the corn, and to go as close to the corn as it could, not to plow it up. The corn would roll up immediately and look as if it would soon wither and die; but by the next morning it would be out again as green and succulent as ever. We kept the cultivator going until the corn was so large it would break, and left it for the hands of nature to finish. This is another instance where cultivating corn during dry weather pays, as this was the only full crop of corn in that part of the county. It was cultivated very deep but left as level as possible. As to late planting, I prefer to get the corn into the ground as soon as the ground is ready to receive it. But this does not consist of having the ground plowed, harrowed and marked off ready for the planter; the ground must be in a state sufficiently warm to bring the corn up. Corn should not be longer than three or four days in coming up, and I have known fields of corn to remain under ground for two and three weeks before making its appearance. This is not according to the laws of nature. The longer corn lays in the ground the more liable it is to rot, and the better chance it has to be eaten by insects. In 1875 one of my neighbors planted ten acres of corn just before the 15th of April and just finished before a series of cold rains; I planted four days later, and that which I planted was up for two weeks before that of my neighbors, and upon harvesting averaged a little over fifty bushels to the acre. Corn that I planted twenty days later came up in three days and on the first of November several shocks of it were shucked and weighed, and the average yield (80 lbs. per bu.) per acre was 81 bushels and 20 pounds. My experience is that the deeper the ground is stirred the better—both in preparing the ground for planting and in the cultivation of the corn. In a dry season the more frequently the ground is stirred by the cultivator—if it is left level—the more moisture it will retain, provided it is cultivated very deep. I would advise the planting of pure corn—not mixing of different kinds and varieties—as it tends to make the corn chaffy and many bastardy ears. I have studied the theory advanced by some, that we should raise smaller stalks and larger ears. Well, and will say I know of no method by which to accomplish this, and I defy the *world* to produce a method of this kind that will bear an actual test. Seed corn should never be taken off the same land it is intended to be planted the following sesaon; as it will have a tendency to lessen the yield. If the ground is plowed up at the proper time and at a depth of eight inches, well

harrowed down before planting, and the corn be not planted before the 15th or 20th of April; and the corn is cultivated as deep as the ground was stirred, and frequently you will have a crop of corn, I don't care how dry the season is, provided you have used good seed corn. There are not ten per cent. as many poor farms in the west as there are poor farmers.

The talk was followed by a short discussion. There was a lack of unanimity regarding the time to plant, many doubting the propriety of late planting, others favored shallow tillage for corn during droughts, but would till frequently. The speaker's advocacy of thorough tillage received the approval of all that expressed an opinion.

THE DOUBLETREE.

BY PROF. S. M. TRACY, OF AGRICULTURAL COLLEGE.

Prof. Tracy desires to have illustrations accompany this address, when published, hence it will not appear until the next volume is printed, as present conditions do not afford opportunity to give it in this volume.

It was clearly shown by the speaker that by the construction of most doubletrees when the horses are not drawing even, that the faster horse would draw more or less than one-half of the load according to the construction of the doubletree. If the points when the strain of the horses is met and the resistance of the load is felt, are in a straight line, the draft will not vary when the relative position of the horses vary. As to whether the rear horse carries more or less than one-half of the load will depend upon whether the point of resistance of the load in the doubletree is in front or rear of a straight line drawn from the outside or end points when the draft is applied.

AFTERNOON SESSION.

Meeting called to order at 2 P. M.

The following talk was given first by M. Fairchild Dowd. Subject:

BUTTER PRODUCTION.

The talk was intended only for a brief and informal introduction of the subject. The speaker reviewed the unsatisfactory condition of the butter production of the State. Attention was particularly called to the increasing sales of oleomargarine in the larger places of the State, Kansas City producing more artificial butter than the clean tallow brought into it admitted. This business should be regarded as criminal and suppressed. After the passage of the State law prohibiting its manufacture, a firm in the place had, he thought, instituted a prosecution to test its constitutionality and procured able counsel from the East to defend it in its manufacture of this stuff called butter. It is unclean, unpalatable, and not fit to use, judging by samples that he had known sold. The milk supply of Kansas City, the speaker regarded as being sold suspiciously low.

BUTTER PRODUCTION.

BY J. W. SANBORN.

The application of the forces of nature, through the multiplied mechanism of the present, has extended greatly the list of man's luxuries; and has also materially increased the proportion of the human family who are enabled to command them. So rapidly is the effective force of man increased by by these agencies, and the purchasing value of labor enhanced, that materials formerly regarded as luxuries, are fast passing into the list of recognized necessities.

Butter is now regarded as one of the required daily foods of every family of America not under the misfortune of extreme poverty.

One of the anomalous conditions of Missouri agriculture, is seen in the fact that the State consumes more butter than it produces. This seems strange and wrong for a State that sells large quantities of food products every year, to be purchasing farm products in a form that is costly, involving the use of skilled methods. I endeavored to ascertain the amount of butter produced and consumed in the State. I cannot find any statistical facts concise enough to use for the year 1882. I wrote to a firm of commission merchants in St. Louis, enquiring regarding the amount of butter produced and consumed in the State, and as to the average quality of butter of home production. Hudson Bros., St. Louis, wrote as follows: "No reliable estimate can be made of the quantity of butter made annually in Missouri. We would estimate as follows: The quality of Missouri butter is about second and third grade. Very little Missouri butter is consumed in St. Louis, this city is supplied mostly by Northern Illinois and Wisconsin. Outside of St. Louis, we believe the State manufacture of butter is about one-half the amount consumed." I have taken some pains to observe the quality of Missouri made butter; and so far as my observation has extended, I must say that it corroborates the testimony above in ascribing to it, as a whole, low character, I have observed that much butter is brought into the State. In absence of other resources, I will give the statistics of the ninth

census, or for 1870, for the butter production of the whole country and for Missouri. By it, it appears that there was then produced 13.33 pounds of butter per inhabitant of the United States. As scarcely a sixth of a pound was then exported per capita, over thirteen pounds were consumed per capita. I find that Missouri is credited with the production of a little less than 8 2-5ths pounds per capita. Assuming the Government statistics to be correct, then either this State consumes much less butter than the average, or produces much less than it consumes. The latter view is undoubtedly correct, for it is known that the warmer Southern States consume less butter than other sections of the country. Probably the butter production of this State is only about one-half of that consumed by the Northern belt of States, per capita, and but little more than one-half of its consumption in 1870, if we can trust statistics. In view of a few facts to be briefly related, it is a strong impression with me that this fact reveals a weak point in our agriculture, where a strong development would be for its, and for the interest of the State.

RELATION OF BUTTER PRODUCTION TO SOIL FERTILITY.

Butter is a carbonaceous food, the materials of which are, or may be, entirely derived from water and the atmosphere, with exception of the slight amounts of caseine and ash found. These amounts are so very near to nothing, but a little over one per cent. of amounts found in milk and only a very small fraction of one per cent. of amounts found in food of the cow, that they may be entirely ignored. The importance of this fact will be more clearly seen in the light of the following figures:

The sale of a 1,500 lbs. steer will take from the farm from 60 to 70 lbs. of mineral matters—of which 28 lbs. will be phos. acid and 32 lbs. lime and about 34 lbs. nitrogen. The sale of the products from the State that would have produced this steer, would, in round numbers, remove ten times as much of these materials (more of some matters of the ash, and less of others,) varying from this proximate statement so far, under varying conditions that it is impossible to give an absolutely accurate figure. A cow that will yield 200 lbs. of butter yearly will require food that contains about 150 lbs. nitrogen, and from 500 to 600 lbs. ash. This is saved to the farm and the State by the butter cow. Missouri has been selling the available fertility of her soil to the world in its cheapest form, until a condition of soil fertility has been reached that demands the retention of the fatness remaining by a conserving system of culture and feeding.

CONDENSING FOOD INTO BUTTER.

The sale of food products through pigs and steers has been strongly advocated as the true policy of the West. Butter is a still more refined animal product, involving not only the consumption of more food for a pound of the resulting product, but likewise involving more skill in its production. Corn is selling in Columbia for 62 cents per 100 lbs., while it costs 42 cents to transport it from the main line of the Wabash road at Centralia to Baltimore. Iowa creamery butter is selling for 38 cents per lb. in Boston, and costs but about one cent for transportation. In the one case, the value of the product is largely absorbed in transportation, selling for 65 cents per bushel in Baltimore; 52 per cent. of its selling value is thus used up; in the other only 24 per cent. of its value is expended on transportation. Corn is a coarse farm product, butter a refined one. In the one we sell more of muscle and less of brain than the other. The first takes a maximum of soil and a minimum of labor and skill; the second a maximum of labor and skill and a minimum of soil. Inasmuch as wealth is a product of labor, inasmuch as skilled labor brings the highest reward and inasmuch as corn sells soil fertility and butter does not, it would strongly appear from reasoning in the abstract that the farmers' policy and the State's policy consists in selling as much of farm products as possible in its highest form. The logic is not conclusive until enforced by facts. I have found by personal trials * that when fed alone 12 quarts of skim milk are required for a pound pig growth; when fed with corn less of milk is required for a pound of growth, after crediting the nutritive effect of corn as found by trials with it alone. When hogs are worth 5 cents per pound live weight for slaughter, skim milk is worth 1-2 cent per quart. At this rate the skim milk will pay all labor bills involved in butter-making, including milking; and the manure, other necessary expenses of shelter and feeding. I will charge to the butter account, pasturing of cow, $5.00; 1-2 ton of English and clover hay, and corn fodder worth here at Columbia less than $10; and 200 lbs. mixed meals, worth $9; total, $24. A yield of 200 lbs. of butter per cow is easily attainable; cost per lb., 12 cents. The food is rated at more than its average price. At 22 cents per lb. for butter, the net farm value for food would be doubled. Western creamery butter frequently sells for 40 cents per lb., and is now selling for from 30 cents to 38 cents in the East; ordinary dairy butter sells for less, yet well made dairy butter sells for very nearly the same figure, while skillful makers and marketers get as good or better prices, as detailed further on. But we need not trouble ourselves about eastern markets until the mar-

* These and other facts of experimental enquiry to be quoted from personal trials, I take from the work at N. H. Agricultural College.

kets of Missouri are supplied with home-made butter. These markets are offering round and even fancy prices for fine butter, and do not get it in sufficient quantity. Thirty, forty, fifty, and even more cents per lb. are paid for good brands.

DAIRYING FOR MISSOURI.

Can we make all the butter that the State needs to advantage? Yes; and vastly more. Can we make good butter, etc.? Yes; as fine butter as can be found in the country. While some is made of the very best type found in the United States, yet I deem it the fact that the average butter made in the State is of a low character; and the methods adopted as a rule are quite indifferent. I need not specify in detail evidences of the truth of the statement. The interests of our farmers demand, however, that the truth should be uttered, and that an awakening should occur; for Missouri has natural advantages in location, climate and herbage, that fits her to become one of the first butter producing States of the Union. Our blue grass pastures afford summer pasturage that gives butter of fine texture, color and aroma. Our moderate winters assure our ability to produce it at cheaper rates than some of the less favored sections of the country. Favorable conditions are only factors in the problem—these are to be, must be, supplemented by high artificial conditions, approved appliances and skill, and then a marked success is sure to follow, and the wealth of individuals and the State be greatly enhanced. The introduction of creameries and large private dairies into Iowa has marked an era in her prosperity. That like success will follow intelligent attempts here, I am sure, from observation of the results of its application.

CONDITIONS OF SUCCESS.

Under this caption it is proposed to give a brief review of the practical conditions essential to successful butter production, alluding to the philosophy of the art only incidentally, when convenient and desirable.

The first essential is the good cow, who should both give quantity and quality of butter. This advise is trite—ordinarily accepted in principle but imperfectly applied in practice. Success follows only in the wake of action, not in resolution. As facts impress us all more than propositions assented to, because plausible, I will give some statistics from experience. I find that a 1000-pound steer consumes 18 pounds of hay daily to maintain existence without growth. This is called the food of support. A cow of similar weight, when dry and farrow, will consume a like amount for mere maintenance. A poor or ordinary butter cow will consume as much or more, food of support as a good or extra butter cow will. Now, as three-fifths of the

food of a cow goes to maintain existence and only two-fifths to butter production, it follows, everything else being equal, that the cow consuming the most of excess food has not only the greatest amount of food for milk production, but has that proportion increased in ratio to the excess food, rather than to the whole food eaten. To illustrate: If a cow would devote only excess food to milk production, then nineteen pounds would give only one pound for creation of milk, while twenty pounds would give two pounds for milk, or, theoretically, twenty pounds would be twice as effective as nineteen pounds. This would not occur in practice, because a cow in milk, on the above amounts of food, would give milk at the expense of the system and lose in weight. Ordinary cows, in milk, fed with hay alone, of a weight of 1000 pounds, will consume twenty-five to thirty-two pounds of hay daily, if having no other food. Cows of good digestive and assimilative capacity consume the most and are usually the best cows for quantity; but I find not always so, for each cow has her own structural capacity to yield milk, and this may be of lower order than her consumptive, digestive and assimilative power. Hence, she may eat more than she will divert to milk production, and the balance will go to the production of fat or be thrown off the system as waste. It is often remarked by dairymen that if they feed high that some of their cows fatten while others will give down at the pail. In several years of weighing of food and milk, I have found, whatever the reason, that when I increased the food to different lots of cows that the milk flow of the better cows increased more than those of the poorer sort. I have had cows who would for an increase of food, even to extreme rations, still increase at the milk pail, while others would either throw off the food as waste or rapidly fatten. A dairyman should test his cows for both food and milk production and dispose of his less valuable individuals. This seems to be too troublesome to some. A dollar in time, here, will make dollars yearly on each cow. The difference between a poor and a good cow in the herd for five years might make from $50 to $75 variation in revenue. The quality of milk is equally as important as quantity. I have weighed the milk of cows that required forty pounds of milk to make a pound of butter, while others, on the same food, required less than twenty pounds for one pound of butter. Thus the quantity of milk from a given amount of food may be a very deceptive standard of measurement for the dairyman. Every dairyman should have a small churn for testing the milk of each cow, and every cow of the herd should be put to the test. Per cent. glasses are often used. These offer an uncertain test, for the density of the cream after rising will vary much; yet a careful study of the character of cream will aid one much. F. D. Douglass of Vermont, who heavily increased the butter product of his cows, claims that he did so by occasionally setting individual cow's milk in

cans about four inches in diameter and twelve to fifteen inches deep, having inserted on one side strips of glass running down from the top, covering a hole cut out of the vessel, so that the amount of cream could be seen; and studying the character of the cream, disposing of such cows as were disappointing. Cows are our machines for milk and butter production. It is a losing policy to work with poor machines in this age. Of what breed the cow shall be time will not allow discussing. If butter alone is the object of the farmer, and beef is entirely ignored, the Jersey will probably yield a pound of butter on the least outlay of food. A cross of a Jersey bull on a Durham cow of milking characteristics, or upon a good native, gives in the higher Jersey grades excellent butter cows. For other purposes than butter the Jersey cow has no reputation. When it is intended to carry beef along with butter a Durham bull of a family bred for milk upon good selected natives gives good results.

The aim of the dairyman should be to so select or to carry an ordinary sized herd of cows to an average of about 300 pounds of butter per cow. This has been attained for small herds by many; but it is an extreme figure when many cows are kept. Two hundred pounds should be the least yield tolerated under the opportunities afforded by the good and plentiful food of Missouri. It is well known that individual cows in several instances have exceeded 700 pounds per cow per year. Eurotas, the property of A. B. Darling, gave a butter yield of 778 pounds ten ounces in one year. The many large yields related of late should serve to dissatisfy us with small results.

FOOD FOR COWS.

Under this heading I include both liquid and solid food; both must be of the best if quantity in butter is to be obtained. Quality, of necessity, must be obtained and constantly maintained. The higher grades of artificial butter come into competition with the lower grades of poor butter and force them to an unprofitable price. In the brevity of the time at my command for this talk I cannot obtain proper estimates of the amount of oleomargarine now made in this country; but it is an astonishing amount, and increasing. It has been estimated that New York alone produces 20,000,000 pounds annually; and several other States make large amounts. Missouri has a law, declared constitutional by law courts, forbidding its manufacture or sale within the State. I judge that this law is somewhat inoperative. Whether operative or not, it is certain that the high grades of butter are and will be paid luxurious prices for, and will maintain good and profitable rates against the artificial butter. But high grades of butter are the product, only, of clear, good, sweet water, sound food and pure air. Instances are related

where decaying animal remains in pastures or near where cows feed or are fed, have affected the quality of the butter by the breathing of the impure air. It is well established that the drinking of impure water affects quickly the character of the milk. The organic germs of impure water, abounding most in stagnant pools, when drank affect the health of cows, making them slightly feverish, but perhaps not enough to be observable.

Prof. Law states a case where milk had a ropy or slimy character; under the microscope animated germs were detected that were regarded to have had their origin in a filthy pool from which the cows drank. The blood of the cow revealed the same germs.

Pastures having impure water accessible to cows should be drained of this water. At the stables, water free from yard or privy drainage should be given.

Food affects likewise the quality of milk. Mouldy fodder of any kind will be followed by butter off in quality. Not only will unsound food give unsound butter, but sound foods will vary the texture and aroma also. This makes the matter of feeding an important one. Unfortunately, no clear basis of classification of foods, with reference to their effect on quality of butter, can be given. Experimental inquiry alone can answer this question. I have devoted much time to weighing food to various sets of cows for several years, and noting the effect in weight of cow, milk product and butter yield. So far as quality of product is involved, I have found cornmeal, with early cut hay and clover, to give butter of best color, flavor and texture, and high in amount yielded. Bran has given me butter of lighter color and, I have thought, decidedly off in texture. The oilmeals give a deep color, but not so natural a butter color as cornmeal or grass, and yields butter of a more salvy grade when much oilmeal is fed. Oats whiten the color of butter, as compared with cornmeal. Bright, well preserved corn fodder or fodder corn, either, give good butter when fed along with hay. With both turnips and mangel wurtzels I have been disappointed. Carrots have proven the best root crop that I have used for butter, and the only root crop that I would think of raising for butter cows. Even this root, where crops are so cheap as here, is of doubtful economy, involving so much of labor in raising as it does.

Regarding quantity of butter, I have found that cornmeal and hay, with clover, are perhaps as good as any ration; yet I have found the following a a good and economical feeding ration: Three pounds each of corn and cotton seed meals and mixed corn fodder and clover hay, often giving at night light foddering of clean bright straw. Bran is a favorite food with dairymen. In two years of accurate trials I found that its substitution for cornmeal was attended with a loss of from 17 to 20 per cent. in butter product,

as well as a loss in quality. I have discarded its use. Many dairymen have regarded the free use of cornmeal as too heating, giving to the cow a feverish condition, and thus affecting injuriously the quality of the butter. I have not noted this result, but know that some feeders of Jersey cows have so complained, and use oats or bran to prevent gargat from the overuse of corn. I think that clover hay, English hay, corn fodder and cornmeal—up to six to eight pounds of cornmeal daily—form a safe ration for a hardy 1000-pound cow. It is not part of the design to discuss forage crops to bridge over dry periods, and the time between full pasture and full stall rations; nor have I time to discuss ensilage and the various methods of preparing foods. I question the profitableness of any of them for this State.

In careful trials I found that the amount of water drank affected materially the amount of milk flow, and that it is advisable to see that stall-fed cows have drink at least twice daily—mornings and evenings. Salt, by some virtue, affects the secretion of milk and should be at the command of the dairy herd.

KINDNESS.

I have noted that dogging cows is a not uncommon method of driving them, often the cows being put to a long run. Cows will fail to give down their milk after being excited by this or any other cause; hence, our best dairymen will not allow even cross talk, without blows, to their herd; some carrying the principle of quietness for their herd so far as to forbid even whistling during milking. This is a departure from the old Roman animal philosophy, for we are told that they desired the driver to whistle while the work oxen, weary of work, were drinking. It is undoubtedly the fact that anything that disturbs the nervous system of the cow impairs her milking quality. If excited at or about milking time, the milk is not fully and freely given, and thus the level of milking quality is cut down. Kindness must prevail always with the cow. A famous dairyman used to say that he always sent his laziest man to drive his cows, and that if he was not lazy enough he went himself. (He was about 300 pounds). Roughness to animals is brutalizing to man. If for no other purpose than for its reaction on ourselves, we should handle our herds kindly.

WARM QUARTERS.

Hay and corn are costly fuel; boards are cheap retainers of heat. For several years I kept a record of temperature and milk flow. The milk flow followed constantly the mercury up and down, varying in degree of change with the degree of change in the mercury. I will give just one illustration of the fact: Jan. 18th to 28th—yield 880 pounds milk; temperature 1 de-

gree above the freezing point. Jan. 29th to Feb. 7—yield, 800 pounds; temperature, 10 degrees below the freezing point. Loss of milk, ten per cent. These figures are given for 1878. During a subsequent period I divided a barn into two sections. One was open to the whole barn; the other was ceiled up. The temperature of the first was an average of about 32 degrees; of the second 45 degrees. The period of trial covered about three months. The animals in the ceiled stalls ate 1.7 pounds less fodder per day and gave 2.8 per cent. more milk. It will be observed that the trial was between two sections of a barn. How would it have been if one lot had been out of doors with the mercury 15 degrees below freezing, and the animals subject to alternate storms, sunshine and driving winds, laden often with snow? The fluctuations of milk flow impair the average product of the cow, for there is a constant tendency to dry down to the lesser amounts given. Suitable shelter will be an absolute necessity of butter production, both for shelter for the cow and for neatness in milking during rainy or muddy weather. Shelter also preserves our fodders from wasting storms and loss in feeding by trampling out.

NEATNESS AND PURE ATMOSPHERE.

The stable should be well ventilated, both for the protection of the health of the cow and the milk during milking. Milk is a very ready absorbent of atmospheric impurities, and a most unstable article. It not only quickly taints by air impurities, but rapidly enters, at ordinary temperature of living rooms, into putrifactive decay. Tests of milk by the side of decaying meat, and in pure air, have shown that the former decays in less than one-half or one-third of the time of the latter, at Summer temperatures. The presence of vegetables or of a ill-ventilated kitchen will taint the milk; hence, a milk room by itself, well ventilated and in a pure atmosphere, away from yard or other odors, should be provided.

In the interests of neatness, the cows should be stalled on elevated platforms, no longer than the cow, and fastened by swivel stanchions. The herd should be bedded and thoroughly cleaned before milking. Many wash and wipe their udders before milking, and insist that the milker enter upon his task with clean hands and garments free from offensive odors. The milk is strained at once through wire strainers and cloth attached.

The pails used are tin, thoroughly washed and scalded with hot water. T. S. Gold relates tracing for damaged milk, sold from Connecticut to New York by the car, complained of by his New York customers, to a dairywoman who washed her cans with a sour dishcloth. Where gilt-edged butter is made many dairymen do not allow the milkers to set the milk into the dairy-room, for fear that the barn odor of their garments will contaminate the dairy-

room air. All the implements of the dairyman are to be kept thoroughly cleaned, and scalded whenever used, cooling after in cold water.

The dairy-house itself must be well ventilated and made to resist fluctuations of temperature. To accomplish this it must have a northern outlook, or be shaded from the direct rays of the sun. It should have double dead air spaces on all sides and at the top and bottom of room.

An icehouse should stand close by, so that the ice can be removed directly from its place to cooling-room or water box, where the milk is set. No dairyman should be without his supply of ice; in fact, no farmer should fail to secure ice. The cost of an icehouse is so little, the construction of it being exceedingly simple, that all can command ice, the harvesting being a cheap operation.

SETTING MILK.

The old-fashioned system of setting by small tin pans is now supplemented by several methods. These may be divided into two classes: Deep cans and broad, shallow pans; and these into various sub-methods. A full discussion of these various designs for setting milk, and the science involved, would be too exacting of time. As between deep and shallow setting of milk, something may well be said, for the impression received is that deep setting is accompanied by a loss of cream. This seems to be mainly a question of temperature. When milk is massed in deep cans at Summer temperature the milk, drawn at blood heat, cools so slowly that chemical changes set in that retard cream raising, and the milk is ruined before the cream is obtained. The specific gravity of cream is less than water, while milk is greater. Each vary, but milk should be about 1032, and 970 or more for cream. Cream rises then, as is well understood, by virtue of its lesser specific gravity than milk as a whole; or, in other words, it is lighter than the balance of the materials that constitute milk. In cooling, the water, which constitutes the bulk of milk, has its globules condensed faster than the oily matter of cream. As the specific gravity increases with cooling, it follows that if the water or milk serum contracts faster than cream, that the difference in specific gravity between the water and cream is increased, and that the cream will rise faster. I find that milk in deep cans, set in water, is cooled to the temperature of the water in four to six hours, while the same cans in air, at same temperature, require several times as long to bring the milk to temperature of air. Thus it is that we get our cream quicker by cold water than by cold air. Returning to deep and shallow settings, I find that if milk is set at too low a temperature by open pans, say 50 degrees, that I get less of butter than from same quantity of milk by deep cans at 45 degrees. When deep cans are set at 50 degrees and pans at 65 degrees, then

I get the most butter from the latter system. If both are set at right temperatures there is practically no difference in the amount of butter obtained for the entire year, for it has been shown by a German investigator that the amounts obtained from each system fluctuate with the season. As between cold air and cold water, it seems to be a question of time, cold air giving as much butter but requiring more time. The cold air is a little neater system and much less troublesome in winter. It requires, however, more space and cans, for by cold water settings the morning's milk is skimmed at night, and the same cans can be used over; by cold air 36 hours' time is needed before creaming.

The points in favor of the deep cans against the pan systems are: Sweet milk always for the calves; less surface to skim and to wash; a more compact system to handle, giving less of slopping about the rooms. The milk can be strained into them at the barn, and then covered from barn odors. The temperature can be more easily kept equitable by their use; the cream is in better shape to churn and always sweet. Objections have been made that the butter will not keep as long, (a question in dispute); that the cream is more bulky, and hence have to churn oftener, and that too little surface is exposed to the air.

Prof. Arnold, in some experiments at Cornell University, claims to have shown (doubtful) that the access of air or oxygen is essential to aroma and keeping quality of butter.

Segelche of Holland is quoted as affirming that aroma is not an inherent quality of milk, but the product of chemical change accompanying lactic fermentation. From the mass of facts already accumulated it is impossible to arrive at any positive conclusion. I have known dairymen who set by nearly all the modern methods, that sell butter for 75 cents per pound and upward. Good success is achieved by all the methods, and a choice is made upon other questions than quality of butter. When I have not cold running water I prefer to set by deep cans, without covers, in cold air. The deep cans are eight inches in diameter by twenty inches deep. The cold air apartments may consist either of a large ice box or a small refrigerating apartment. If it is decided to set by cold air a temperature at or below 45 degrees will have to be maintained; if by cold water a temperature below 55 degrees will answer, but below 50 degrees is better. When the shallow pans are used it is desirable to maintain a temperature of from 60 to 65 degrees. Without ice it is difficult to do it in Summer and costly in Winter, but should be approximated to or loss will occur in cream. A well protected room in Summer, with blinds and double windows open at night and closed by day, will aid much, but will fail of keeping, except in favorable conditions, a satisfactory temperature. Under such conditions as ordinarily occur in Sum-

mer, with open pans, skimming must be timed to the condition of the cream, taking it off before acidity progresses.

CHURNING, WORKING AND PACKING.

After skimming, cream should be kept at an even temperature. If to be churned within a short period, a temperature of about 60 degrees will be suitable. If to remain for a few days, it is better to keep it at a lower temperature to prevent too much change by lactic fermentation. At every skimming it is well to mix the cream well together. If this is done and the cream is warmed to 60 degrees and allowed to stand 12 to 24 hours, the mass has a uniformity of condition. It will be, as dairymen express it, "ripened" with uniformity. Before churning, I prefer to so ripen my cream. It is claimed that cream so ripened gives butter of better keeping quality, the chemical change induced disengaging the caseine that may have attached to the rising cream; and as caseine, or nitrogenous matter, is the seat of the change that results in rancid butter, the less so retained gives less liability to damage. As the deep can opponents claim that butter made from deep cans does not keep as well, because of its partial exclusion of air and the greater proportion of caseine retained in butter, so its friends reply that ripening removes the difficulty. Another advantage claimed in ripening cream is that more butter is obtained. I have divided cream with great care several times, and churned one-half at once and allowed the other half to remain 24 hours. I do not always get more butter, but generally do for ripening, and believe that butter has a full better color, and perhaps flavor, (am not certain). Before passing onto churning I wish to urge the use of the thermometer. I find that it is but little used; and yet it is indispenable. It will save many a long churning and mashed butter granules, because of churning too cold; and many a greasy product because of churning too warm. Butter churned at too low a temperature will not give so large a product. When the thermometer is used we do not have to put a hot iron in the cream, as of old, to drive out the witches. The temperature at which to churn varies with the season of the year, the breed of cows and the system by which we set the milk. Jersey cows will often require their cream churned at a lower temperature than other breeds. I find that I need to churn at a higher temperature for deep can settings than for shallow pan settings. The range of temperature may vary from 58 to 64 degrees. Sixty degrees in Summer and 62 to 63 degrees in Winter are usually endorsed.

The churn used should be one that gives uniform agitation to all parts of the cream alike, not suffering some parts to remain slightly agitated. Churns with small flyers and rapid revolution should not be used, as they tend to pulverize the butter globules into a mass of salvy grease. They

churn too rapidly and with a lack of uniformity of agitation that results, frequently, with a less butter product. The iron attachments often leave dark, greasy streaks in butter. For the above reasons, I prefer a rotary or occilating churn. These have a plain inside surface, easy to wash, and no irons to leave their sable finger-marks. Butter is brought in them, not by blows of angular paddles, but by concussion against plain surfaces.

In churning, a slow motion should be given at the start, in order not to induce foaming. The cream should be frequently put down from the sides, if the churn used requires it. Whether butter should be washed is an open question, with practice favoring washing. It is thought by some that the flavor of butter is affected by washing. I have sometimes so thought. The milk sugar may be dissolved out to some extent. This is said to be desired by some, and not by others. Inasmuch as washing removes more perfectly the buttermilk, and does not injure the butter globule, the process will be extensively used. As soon as the butter begins to collect into masses of the size of a pea, or under, put into the churn a pail of water of same temperature as the butter, or under, according to the condition of the butter, give the churn one or two strokes and then draw buttermilk through a strainer to retain the butter that may flow off. Repeat the washing until the water is clear. Twice is ordinarily enough. It is now common to wash with a salt brine, it being more effective. The butter is then removed to a butter-worker, which has previously been scalded in hot water and cooled with cold water, and the buttermilk that can be removed by slight working taken off, when it is salted from one-half ounce to one ounce, according to the demands of the market. This salt must be weighed, not guessed at, and sifted over the butter, the butter having been previously rolled out evenly into thin layers. After sifting over one side one-half of salt, turn and sift balance over the other side. A slight working is then given, when the butter is put away for 12 to 24 hours for the salt to dissolve and penetrate the entire mass of the butter. All do not work twice, yet it is generally better to do so. I have often seen butter streaked and ill-looking for want of thorough incorporation of salt through mass of butter at the first. A second working serves to remove more of the buttermilk. The danger of overworking must be avoided, for the tendency of working is to destroy the fine, sparkling granular structure of fine butter and to give it a dull, greasy look and feel. Never be contented to work butter by hand. The process of working by hand and the hands' warmth soon give the butter a somewhat salvy appearance and consistency. In working butter the hands should not touch it; paddles to handle it in using the worker, and pounders to pack it away in tubs, if tubs are used, seould be provided. After some little inquiry and observation, I find that butter is put on our markets with its buttermilk often

scarcely one-half worked out, and that almost all of it is hand-worked and packed. Butter with the buttermilk remaining in it, of course, will keep but a short time, and must be sold at a low rate and on home markets, whether good or bad.

Before packing butter, if it is to be packed, the tub must be soaked a few days in a strong salt brine, When ready the butter must be well pounded down, so as to leave no large air spaces in the mass to facilitate its decay. A clean muslin cloth should be spread over it and covered with salt; and if to be kept (which is not universally desirable) covered with a strong brine. If thus prepared, and stored in a dry, cool, sweet place, it will keep well. But it must be remembered that fresh butter is the best and that it deteriorates in flavor with time.

MARKETING.

Marketing is perhaps the most important part the butter-maker has to play. It is peculiar to the industry of farming that its votaries act more parts than those of any other business or profession, when that industry is intelligently prosecuted. The farmer is a worker, an employer of labor, (hence an executive man), a student of laws and processes and a mercantile man. In the sale of butter this last quality needs good development. Skill may produce an article meriting high reward, but unless the article is put in the way of getting its reward it may not fully come. I will describe an individual case of successful marketing that came under my notice. A gentleman went into one of the large cities of the country, quite distant from his home, and found a reliable butter dealer, who handled only the best grades of butter. He arranged to send him his butter without even attempting to fix the price, resolving that the butter should make its own price. The nicest conditions were observed in its production; it was put up in little prints with tidy wrappings, having his initials stamped upon each in an attractive form. It was sent to market in iced boxes. It went upon the tables of the rich. Their guests' attention was attracted to it by its superiority. They called for butter with the gentleman's stamp. The result was that, although distant, he had individual customers, and in time sold his butter for 60 cents, or more at times. Others have thus received $1 a pound, and even more. By giving those figures I would not hold out the thought that those are prices likely to be obtained. The purchasers of $1 butter are limited, and often $1 butter is no better than 50c. butter. This, however, is sure, that there is a demand for more of good butter at much higher rates than nine-tenths of the butter is sold for, and at remunerative prices, and more remunerative rates than corn or beef or pork sales will give. In this intended practical review of the subject I have been conscious of the many

details that partially inexperienced butter-makers will desire that I should have covered, and others that I should have been more specific regarding. I can only say that it is impossible to cover the ground in a brief review. For expert butter-makers, and to students of the philosophy of butter making, of course I have not spoken.

ASSOCIATED DAIRYING.

Of the systems and methods of associated dairying it is not thought to speak. That this method of butter making has much to commend it is beyond doubt. When our State produces a surplus of butter that has to seek a distant market, then we may look for creameries, or whole milk butter factories, to spring up all over the butter producing sections. Could they be organized now the grade of our butter would make an immense stride, and bring the State into fame as a butter State.

With the development of the butter dairy must come more attentive methods, shelter for stock, an improvement of our butter cows, and an educating of the laborers as milkers. In the latter operation it is possible, and perhaps probable, that laborers in other sections of the State take more kindly to. However, this is one of those minor matters that adjust themselves when occasion demands. Whatever the issue of the associated dairying question, let us not forget that there is a large home demand, unsupplied, for butter, at from 30 cents to at least 70 cents per pound. In meeting this demand we shall diversify and elevate the character of our farming.

THE CHAIRMAN: I have now to introduce Prof. S. M. Tracy of the State Agricultural College.

FARM EXPERIMENTS AT THE COLLEGE FARM.

BY PROF. S. M. TRACY.

The following is a brief outline of the leading points in the field experimental work which has been carried on at the Agricultural College during the past six years.

Of corn, about eighty varieties have been grown, with a view to ascertaining their comparative yield. Seed of all the promising varieties advertised by both Eastern and Western seedmen was procured and planted, together with varieties obtained from neighboring farmers. One-fourth of an acre was planted to each variety, the land selected for the trials being quite uniform in character, and during three years duplicate plats of each variety were planted, one plat being on white oak ridge land and the other upon creek bottom. As the different sorts were grown on small areas and adjoining each other, it was, of course, impossible to save seed grown in the trials, and new supplies had to be procured yearly. The design, which in most cases was carried out, was to plant each variety three successive years. Of all the varieties tested none were found which gave as great a yield per acre of shelled corn as did the "Evans," a large yellow dent variety which has been grown on the college farm since 1872. In this variety the ear is of good size, the grains very long, cob small and well filled. One hundred stalks give about one hundred and twenty ears. The crop always matures before frost and the stalks stand up well. Of white varieties Thompson and Proctor Bread have proved most profitable. Blount's Prolific, extensively advertised a few years ago, has not proved satisfactory. It has usually one medium sized ear, one or two small ears and often four or five nubbins. For fodder this is doubtless an excellent sort, but the weight of shelled corn per acre is not equal to that from several other sorts.

In wheat about one hundred sorts have been grown. Of the better known sorts none have been found more profitable than the Dultz, which has always given a good yield and is of fair quality. The crop grown in 1882 yielded 39½ bushels per acre, weighed 64½ pounds per bushel, and a car-load

sent to the Chicago market graded No. 1. In 1877 sixty varieties of wheat were received from Russia. About one-half of these were of very inferior quality and were discarded after one year's trial. Others were discarded from time to time, except one variety, the "Ostery," which promises to be very valuable. Its average yield since 1877 has been 32½ bushels per acre and its weight 62 pounds per bushel. Its weight this year was 65 pounds. It is a white variety, and millers pronounce it of fine quality for grinding.

Of potatoes several hundred sorts have been grown. Of the ordinary varieties the Early Ohio has been best for an early sort, and Pride of America, Early Vermont and Beauty of Hebron for later use. Considerrble attention has been given to the production of new varieties from seed, and the college now has several seedlings which promise to be better adapted to our Missouri climate than are any which we now have.

Details of these trials may be found in the Board of Agriculture reports for 1878, 1879 and 1880.

In fruits about eighty varieties of apples, thirty of pears, forty of peaches, ninety of grapes and sixty of strawberries are being grown. Most of these are new varieties which have not yet been grown in the West.

ANIMAL GROWTH AND NUTRITION.

BY PROF. J. W. SANBORN.

Mr. Sanborn gave an hour's talk on the economic problems of stock feeding, from the basis of personal investigations. The short time at command before the issue of this work did not allow of writing out the address. The speaker is engaged in stock-feeding investigations at the College farm, and will, in the future, present experiment work that bears on the economy of the foods of the State in animal rations.

The ground covered was: The steer to feed; shelter; early maturity, and food combinations. The economy of good methods in each of these departments was illustrated by experment data. It was shown that under certain food combinations corn fodder and straw have a high nutritive value. A great many questions were asked the speaker, who, acting as scribe, is unable to report.

Mr. A. B. Mathews presented the cause of fat stock shows, and particularly that one just organized at Kansas City. He believed the Smithfield fat stock show of England had done more good than all the other English fairs put together. The Chicago fat stock show has proven their utility here, and all are interested that success attend the recent movement. Good men were in it.

Adjourned *sine die*.

This closed the first Farmers' Institute meeting conducted in the State, I am told. Considering this fact, the meeting was quite satisfactory in point of attendance for the second day, a very good and intelligent audience being in attendance at the afternoon session. About thirty only were present the first day.

The Board confidently believe that a good work can be accomplished and resolved to prosecute it with energy.

SORGHUM AS A SOURCE OF SUGAR.

The following address was delivered before the Mississippi Valley Cane Growers' Association, by Gov. Coleman, a member of the Board of Agriculture. Gov. Coleman was present at the Independence meeting, and would have given an address on Sorghum as a Source of Sugar, but for prostration due to overwork, that confined him to his room during the progress of the meeting. By his consent, this address is used, as covering the ground desired. The society before whom it was given do not publish a report.

GENTLEMEN: You have again assembled in annual convention to manifest your faith in the important industry which numbers you among its devotees. You have come from your fields and your factories, bringing with you not only your increased experience, but samples of your workmanship. These have been spread out on the table in this hall that the public may judge not only of your workmanship, but also of the real merits of the great industry in which you are engaged. When I say that the samples of sugar and syrup here exhibited compare favorably with those produced from the Southern ribbon cane, I think I am not going too far, and believe this opinion will be concurred in by Southern sugar planters themselves. When the fact is understood that these samples have been produced by men with little experience, who have had to grope their way almost in the dark; and yet who have obtained such grand results, it speaks more eloquently in behalf of this great industry than any language I can use. And when I go still further, and say that notwithstanding the past unpropitious season, it having been the most unfavorable ever experienced in the germination of seed, much of it laying in the soil one to two months without growing, by which time the ground was covered by a mass of weeds—yet, notwithstanding this, the industry has paid its followers better than most other branches of farming; it shows that it is on a good footing, and on the sure road to more general adoption and to a higher success.

To the attentive observer of our agricultural interests, the field which this comparatively new industry opens is a most inviting and important one. In most other branches of agriculture the great fear is over production. Failures of crops in the old world, for a succession of years, have opened markets for our surplus products at fairly remunerative prices. But for

these failures of crops abroad many of our farm products would be a drug on the market, not paying the cost of production, and producing a financial crisis in our country; for upon the prosperity of our farmers does the prosperity of our country depend. With good crops abroad, so as not to call for our surplus breadstuffs, a financial panic would follow as surely as the rising sun follows its setting.

To avert such disasters every new avenue of production should receive most hearty encouragement by every well-wisher of his country. This encouragement, I am sorry to say, has not always been given to the sorgo industry. It has in many cases received the cold shoulder, and its followers have been treated with ridicule. It has had to fight its way against the current of public opinion, and is still encountering the same current. But, thanks to the energy and perseverance of its followers, it is still making headway, and has achieved greater triumphs the past year than ever before, as will be fully shown before this session closes.

When the fact is considered that we are paying about one hundred millions of dollars annually to foreign powers for sugar, thus draining our country of this large sum of gold yearly, it seems that every true patriot ought to extend the most cordial welcome to any industry that promised to make this commodity on our own soil, and to keep this vast sum at home, distributed among our own people. I predict all this will be done, and within the lifetime of some of those who now hear me. I have no hesitation in putting myself on the record, at this time, as saying that within the next twenty-five years this country will not only make all the sugar it consumes, and of the very best quality, but it will export it in large quantities. I know that some wiseacres will deride these predictions, but I make them because no other plant possesses so many merits and advantages as a sugar producing plant. It adapts itself to our soil and climate from the British Possessions on the north to the Gulf of Mexico on the south, and from the Atlantic to the Pacific Oceans. Its chief rivals are the sugar beet and the true sugar cane of the South. The sugar beet has been tried again and again, in various parts of the United States, with uniform failure, unless in one or two instances in California. But even if it succeeded here as well as in Europe, it could not compete with the Northern cane. It is a gross feeder, a fearful exhauster of the soil; requires a large amount of hand labor in seeding, thinning, weeding, hoeing, digging, harvesting, and on that account, if no other, could not compete with sorgo, for labor is too expensive in this country. Then it has no compensative returns like sorgo in its crop of seed. And it is in this respect that sorgo has advantages over all other sugar producing plants. It is this which will place it on the proud pedestal of success. It is this which will make it a hot rival, even of the ribbon cane of the South.

This crop of seed, in its feeding value for all kinds of live stock, is equal, or nearly equal, to corn or any other grain that can be raised on an equal area of ground. It is produced as easily as corn. The seed raised pays for the planting, culture and harvesting of the crop. It is richer in starch even than corn, and if glucose is to be made, if the people will have it, it is better for that purpose than corn. The sorgo cane, then, is produced free of cost—that is, the seed will sell for more than the cost of production. Not so with sugar beets. Not so with the Southern ribbon cane. The cost of both of these is a very heavy one—a very serious one. The juice of the Northern cane shows about the same degree of saccharine as the Southern cane. Nearly as large a per cent. of juice can be obtained from the Northern cane as from the Southern cane. It is true, not quite as large a tonnage per acre can be produced, but then the Southern cane is restricted to a very limited region, while the region for the Northern cane is practically limitless.

We do not make this comparison between Northern and Southern cane to disparage the latter, but to show what advantages the Northern cane really posseses. The South can utilize the Northern cane as well as the North. And even already, on some Southern sugar plantations, the Northern cane is being successfully raised. It ripens long before the Southern cane is ready to be worked, and produces two crops from the same planting. If planted in the South it would largely extend the working season in the sugar factories, and thus give greater profits upon the capital invested in factories, with scarcely any increased expense.

So far as the Northern cane growers are concerned, I know they want to cultivate the most cordial relations with their Southern brethren. They have a common interest. The planters of Louisiana do not produce one-tenth of the sugar our country consumes, and never will produce it. Our population is hourly increasing, and the consumption of sugar is increasing with it. Some one must produce the large extra amount demanded by our wants. The Southern sugar planter will certainly prefer to have this supply come from his own countrymen, instead of from foreigners. He will prefer the upbuilding of our own country to any foreign land. There is no cause for any estrangement between the different sections, but every reason for the most kindly sympathy and interest in each other's welfare.

It may be that some may think that we are building too grand a superstructure for the Northern cane industry. What can be done in one place in the North, with the same means, can be done in any other place. If any one experiment has been made, on a sufficient working scale to show financial success, with precisely the same means, other experiments will produce similar results. If one establishment has, invariably throughout the working season, turned out sugar in paying quantities from the Northern cane, any

other establishment, conducted in the same manner, can turn out sugar equally profitably. It is true Northern sugar makers have had much to learn, and there is much yet for them to learn. But was not this the case in Louisiana? Was not effort after effort made to produce sugar from the Southern cane without success? Was not the culture of sugar cane abandoned in its early history in Louisiana because sugar could not be produced in sufficient amount to pay? But perseverance and skill triumphed at last, as it has done in the North. The road to success has been found, and it is so simple, so plain, so certain, that any one with a fair share of intelligence and skill can always travel it, and even without making a blunder. I make this statement from my own personal observation. I have seen the cane pass through the mill, and have traced the juice from the cane till converted into sugar; and any intelligent twelve-years-old boy could understand the process, and, with a few weeks' experience, I verily believe, make an excellent quality of sugar.

I visited the Champaign, Ill., Sugar Works this past Fall, during the working season, and was surprised to see with what certainty sugar was made. I supposed that some time during the working period of two months or more they would fail to make sugar; that the cane would be in such condition that the juice, when reduced, would not granulate. But in this I was mistaken. The miller no more surely turns out flour when wheat is put into the hopper, and the mill set running, than this establishment turned out sugar when the syrup was reduced to the proper degree.

And this, too, in the most unfavorable season, as cane growers know that we have had for a long time, on account of the late, wet, cold Spring, seed remaining in the ground from one to two months without germinating, and the temperature of the season being very low and the rainfall very heavy, making the cane very late in ripening. These causes causes contributed to prevent the usual saccharine strength of the juice, and it was not expected by the managers of the works that sugar would be obtained; and yet from forty to fifty per cent. of the syrup granulated and made an article of sugar that commanded at the factory, by the car-load, from 8 to 8½ cents per pound. Even in this unpropitious season, all being new hands at the business, the product of the factory is about 125,000 pounds of sugar and 22,500 gallons of molasses, having a market value of about $19,000, raised from about 250 acres of cane, saying nothing of the value of the seed, which, if included, would bring returns to nearly $100 per acre. The company, after paying all expenses and allowing ten per cent. on the cost of buildings and machinery, for wear and tear, have declared a dividend of 8 per cent. on the capital stock and have a surplus of $3,000 to begin the work of next season.

The sugar works at Rio Grande, N. J., were put up on a still larger

scale and with most satisfactory results. But we shall hear from parties who have had the management of these works at this meeting. What these establishments have done, with absolute certainty every day, thousands of establishments might do in any part of the North, worked in the same manner. Here is a most inviting field for capital and enterprise; and who will say that, in a few years, we will not be independent of foreign nations and prevent this annual drain of one hundred millions of dollars for foreign sugar.

But it is not to encourage the manufacture of sugar only that this society is organized. It is also to encourage the men of small means in every neighborhood to make a pure, healthful article of syrup. This already, in the aggregate, amounts to millions of dollars annually. To show how the best article of syrup can be made the most economically is one of the objects of this association. It is possible that even the small farmer may yet be able to make sugar; but now it calls for a larger outlay of capital than most farmers have at command; still, we see no reason why the farmers of a neighborhood may not unite their means and erect and run such establishments with profit to themselves and to the farmers who may supply them with cane.

I congratulate you, gentlemen, upon the increased interest this association is creating; upon the enlarged attendance at its meetings; and especially upon the fact that it is drawing to its annual convocations some of the most scientific men of the country. Most of the State universities and agricultural colleges in the West honor this association by sending to it their ablest professors. This great industry is worthy these manifestations. If he who causes two blades of grass to grow where only one grew before should be considered a public benefactor, what shall those be called who have freely contributed their means, their time, their labors, their grandest efforts, to add another production—a new industry—to the already large list which has contributed so much to our country's glory. Gentlemen, you are engaged in a noble work. If your efforts, your labors, are not now appreciated, they will be in the near future. Your names will remain green in the memories of a generous people for having given aid to an industry in its infantile struggles when it so much needed assistance—an industry which will prove to be hardly second to any of the important ones that have given to this country its prestige throughout the civilized world.

The following was furnished by Hon. F. D. Coburn, who was to have addressed the audience at Independence at the Friday night session. Unpropitious weather prevented an audience, and Mr. Coburn was unable to be present on Saturday, when a good number of farmers were present:

PORKISH POINTS.

Hogs and Their Helpfulness to American Prosperity.

[Extracts from an Address by F. D. Coburn.]

The United States Agricultural report gave the number of hogs over six months old in the country in 1870 as twenty-six and a half millions, worth $7 each, or $187,000,000. In 1880, according to the census, there were of all ages 47,683,951 head, worth at $5 each about $238,419,755. Of this number, Iowa, with its 6,034,316, was far in the lead of any other State; Illinois came next with 5,170,266; Missouri third, with 4,553,123; Indiana fourth, with 3,186,413, followed closely by Ohio with 3,141,333. These five States, with Kentucky added, contained more than half the hogs in the Union. Wyoming, where the women vote, had only 567 of all ages, sexes and colors. Seventeen States had more than a million each, namely: Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Mississippi, Missouri, Nebraska, North Carolina, Ohio, Pennsylvania, Tennessee, Texas and Wisconsin.

Fifteen years ago the total annual receipts of live hogs at all the principal pork centers were 3,958,000 head, while in 1880 Chicago alone received almost twice as many. I presume it is safe to say that the majority of the persons present have always had a vague idea that Cincinnati somehow was and is the great pork and hog market of the world; that it is a large city whose inhabitants are mostly packers, dealers in and shippers of hogs and their products; that it, of all places on this planet, is the great porkopolis, where houses and streets are filled with hogs, alive and dead, and the sidewalks redolent of blood, bristles and bologna. Fact—which is stranger than fiction—reveals that *fifteen years ago* Chicago was handling three hogs to Cincinnati's one, and in 1880 almost *nine* times as many were marketed in Chicago as in the Queen City, while New York, Buffalo, Indianapolis and Kansas City all surpass her in receipts of swine. As to packing, Chicago in the year ending March 1st, 1882, carved and cured upwards of 5,100,000—more than ten hogs to one slaughtered in Cincinnati, and during the same perio

Kansas City, the young giant of the New West, packed 810,000—more by fifty per cent. than Cincinnati or any other place except Chicago. If a hog visits Cincinnati the probabilities are that he will be bled to death before being permitted to leave town.

The heaviest net average for sixteen years past—which is all we have reliable record of—of the hogs packed in the United States in any one season was 232½ pounds in the season of 1872–73; it was almost as much in 1866-67, while the lightest was in 1867-68, when the average was only 201 pounds. In 1873-74 the average of lard per hog was a fraction over forty pounds, while the lightest average, only twenty-nine pounds, was noted in the season of 1867-68. It is of interest to note weights of the hogs packed at different points, and I have chosen an average of those slaughtered during the winter of 1881-82. Those at:

	Weighed gross lbs.
Chicago	271
St. Louis	253
Milwaukee	270
Louisville	250
Indianapolis	246
Kansas City	246
Cincinnati	264

The average weight dressed was: At

	Pounds.
Chicago	216
St. Louis	203
Milwaukee	216
Louisville	200
Indianapolis	197
Kansas City	196¾
Cincinnati	211

Those slaughtered at these different places yielded lard per hog as follows:

	Pounds.
Chicago	39½
St. Louis	35
Milwaukee	33½
Louisville	29½
Indianapolis	29½
Kansas City	37
Cincinnati	36¾

Among the peculiarities of these comparisons are that, while the Chicago and Milwaukee hogs differed only a pound in gross weight and dressed exactly 216 pounds each; the Chicago hog yielded about 22 per cent. more lard; the St. Louis hog yielded about 5 per cent. more lard than the 274-pound Milwaukee hog; and the Kansas City hog of 246 pounds the same weight as the Indianapolis porker, affords 24 per cent. more shortening, which is equaled by no other except the Chicago hog, which weighs just 25 pounds more and yields two and a half pounds more lard.

The average net weight per hog of nearly 6,000,000 head packed in the season of 1881-82 was 207¾ pounds, and of lard per hea d was 35½ ounds.

The lowest yearly average price of lard per pound in the Cincinnati market in 36 years was in I846, when it averaged throughout the year a little less than 5½ cents; the highest throughout the year 1865, when it averaged 20.55 cents. The lowest average price per barrel throughout any year for pork was $8.50 in 1846; the highest average price throughout a year was $32.95 per barrel in 1864, during the months of which it varied all the way from $20.25 to $43.35 per barrel.

As to the pin-money that the hog brings to this county, I will say that the Treasury Department reports that for the year ending June 30, 1881, there were exported hog products valued at about $106,000,000. The same report shows the exports of other animals and their product in the same period, and I find that by taking all the cattle, the horses, the sheep, the mules, the fresh and salt beef, the butter and hair, tallow and hides, the cheese, glue and horn combs sent abroad to alleviate the hunger and other wants of Europe's teeming millions, they foot up $55,000,000, or a fraction over *half* as much as we realized on the hog trade. The exports of the year following were about 20 per cent. less in both classes, but bore to each other about the same ratio, except that for the latter period the swine account is to be credited with $11,114 that we took in for bristles.

* * * I have all my life observed that when the average agricultural writer wants to print something that will show a profound knowledge of the animal kingdom, and his sympathy for suffering fellow-creatures, he proceeds to expatiate on the cleanliness of the hog and the barbarity of men who permit him to wallow in a mud-hole. It has been with me a subject of wonder, as to whether the authors of such articles really ever raised any hogs or even took pains to observe their natural habits, and I am persuaded that the printing of such articles does more to disgust practical farmers and breeders and make them doubt the value of whatever else they may read in their agricultural journals than any similar articles published. Just what desirable end is to be attained by representing the hog as such a cleanly,

much-maligned chap has been a mystery to me, when men of large practical experience know him to be a scavenger by nature.

It is the opinion of a good many tolerably sensible people that one of he most valuable peculiarities of a hog's nature is his ability to utilize and onvert into valuable merchantable product a great deal that would otherwise go to waste or become a nuisance. This, instead of being discreditable o him or his master, is one of the very qualities that makes him a useful nember of society, and enables him to fill well the sphere in which he was ntended to peregrinate. So far as what he eats is concerned he is no less lainty than most fowls; he simply knows what he likes better than the professors can tell him, and with half a chance he will go directly to it. As a ase in point, he cannot at any time be induced to eat so much mush and sweet milk that he will not then, even with considerable discomfort to himself, travel a goodly distance to hold a *post mortem* on a mule or cow, deceased any time subsequent to the first of the then current month.

The theory of be-spectacled professors tells us that nothing suits the hog better than to have his body (which only becomes soiled through his master's barbarity) in the limpid waters of a babbling brook; while stern experience shows that he will abandon the laughing brooklet at any time for an hour's repose in a bath of mud, mortar, manure and nastiness. Of course this is all very new and very shocking to many good people, yet the hog can do all these things and still be more cleanly than most dogs, that are regarded as such elegant pets by many women and men, of both sexes. He has his little peculiarities, like other people, but back of that he is chock full of merit and meat, aad that too without any of the pretentions some of the fifth floor writers would ascribe to him, and as his friend, I protest against his being misrepresented.

The United States Agricultural Department publishes the estimated value of the hogs over six months old in each State in January, 1880, in which the variations are somewhat surprising. In Massachusetts the value per head is set down at $12.46; further south, in Florida, the hogs are rated at $2.33 each, and no doubt it is a liberal estimate; Mississippi is higher up in the scale and her hogs average at $2.70, and Texas shows up with nearly two millions of $2.55 hogs, while Oregon goes her a nickel better. Iowa's millions are figured at $5.36 each; Illinois at $5.61; Kansas at $5.28, and Missouri, located between the two, is allowed but $3.34 per head, and yet within her borders are some of the finest that ever rested on glad earth's bosom.

While in recent years patient care and skill in breeding have produced an animal that can in a short time be converted into an animated, walking lard tub—and in that respect a stupendous improvement upon any hogs of their size the world has ever seen—the artist is yet to appear who can produce at

will such as have in happy unison those layers of fatty and muscular tissue known to connoisseurs as marbled meat, and to our plain-spoken farmers as a streak of lean with a streak of fat, or "streaky bacon." At the present time the breed of hogs a person has is pretty sure to be claimed by him as of those having the greatest percentage of lean meat, whether that breed be the Chester, Essex, Suffolk, Poland-China, Jersey Red or Berkshire, while I doubt if any man on the face of the earth has definite, reliable data that would enable him to decide satisfactorily, even as between any two breeds which excels in that direction. As lean meat is muscle, and activity tends more to the development of muscle than fat, and the Berkshires are claimed by their friends as being reasonably active, and by their opponents as entirely too much so, I am of the opinion a thorough test would show their meat as well or better marbled than that of any other of our improved swine, though I do not *know* that it is, nor do I believe that anyone else does.

The hog that otherwise fills the bill and is properly lean and fat at the same time, is yet to be invented; this vale of tears has not yet been illumined by his jocund presence, or the throats of its pilgrims lubricated by rashers from his unctuous carcass. Whenever that happy day arrives, and his brief tale of life concluded; with his body offered as a sacrifice to the insatiate desire for more lean meat and "red sop," it will be found the product of much besides Indian corn straight. While Indian corn is the most easily produced and convenient single article of hog feed we have, all things considered, the victims of it solid in the porcine family, like the victims of it liquified, in the human family, are each year numbered by tens of thousands, among whom are always the finest specimens—the brightest and best. Corn sustains something of the same relation to hogs that beans do to men; notwithstanding the fact that beans are considered as one of the most wholesome single rations known for soldiers, more men I dare say fell in the late war victims to poorly-cooked beans than to bullets.

For many years I have earnestly urged the cultivation for swine of a variety of other crops than corn, and in my experience, taking cost into consideration, have found nothing that I feed in connection with grain that affords so much satisfaction as some good variety of field pumpkin. With one seed planted in every eighth row of corn they are raised without appreciable expense, yield enormous quantities of succulent food that hogs of all ages, even after gorging themselves with corn, eat largely of with amazing relish. Making something of a specialty of pumpkins for the purpose indicated, I never yet succeeded in raising too many, and never knew anyone else to have enough. I always imagined that the hogs felt about this particular fruit as did an old ex-Missouri neighbor of mine who each Fall religiously made it a point to have a barrel of sorghum molasses made up and the

rafters of his double log house festooned with coils of dried pumpkin, because he "allowed they made such splendid tarts." I do not wish to be understood, however, as advocating the substitution of any such watery food in lieu of grain for fattening hogs, but would use it simply as an adjunct, helpful somewhat as a nutrient, and more as making a variety, distending the stomach and promoting digestion.

That our Western farmers, especially in Kansas and Nebraska, have in many instances apparently lost sight of the fact that the hog is a grass-eating animal, I account for largely by the scarcity of timber for cheap and ready fencing material for pastures, and the lack, as yet, of tame grasses, of which there would, even now, be much more were not fencing so expensive. Besides, growing tame grasses has as yet been largely an experiment on our western prairies, and the seed is seldom sold for aught but ready cash, which, alas! too many of us do not always possess. While many of our people are too poor to fence extensive pastures, most of us can enclose ground for a goodly plat of artichokes, oats, rye or alfalfa—(and my friend Prof. Shelton says one acre of alfalfa will yield as much pig-feed as five acres of artichokes)—or at all events can plant sweet corn to cut up and feed green, as a part of the summer rations, insuring better health and better growth for the porker, and a fatter pocket-book, better health, and a better coat and a cleaner conscience to the owner.

The time is passed when lard is to be considered the sole end of a hog, it has ceased to have exceptional value, and the desideratum is, and will continue to be in our generation, the production of flesh rather than fat; or rather, a carcass in which both are blended in palatable proportions. I would surrender no jot or tittle of any of the vast improvement we have already made, and only plead for others still, that we can, and should and will attain.

When a man asserts that Berkshires are superior to all other hogs for Americans, I do not believe him; if another tells me Poland-China are the best hog for Americans, I do not believe him; if a third tells me the Essex, the Chester White, or the Suffolk or Jersey Red is best, I do not believe him, though the breed he admires may be, and probably is, the one he should handle, for believing in a variety of stock is one of the secrets of succeeding with it. The truth, as I interpret, is that there is a place for each of these different sorts, and I no more expect to see one of them adopted to the exclusion of all others, than I expect to see all men profess one religion, or all join the noble association of callous-handed farmers that I see before me. The animals that in a certain locality and under certain surroundings and systems of management, prove pre-eminently satisfactory, may, under other circumstances, and in other hands, prove little else than an antidote for both peace and prosperity. The fact that four-fifths of the hogs sold in our great

market centers are black, or nearly so, shows plainer than words that white hogs are under a ban,—if not in process of rapid extinction. The wherefore of this is a problem that I, as an early breeder and champion of the whites in the West, and in my maturer years of the blacks, I can only account for on the theory of the survival of the fittest.

THE FORESTRY INTEREST OF THE WEST.

BY S. B. SCHLICHTER, KAS.

Prepared for the State Board of Agriculture by request:

It is obvious to all intelligent men, that the subject of tree planting has wide and general relations for economists and statesmen to consider. Its interest is not confined to the farmer whose land is without the needed timber. It involves, with the spread of settlements westward, possible influences on climate of the highest consequence to the west half of the Mississippi Valley.

There are six principal objects or purposes for which timber may be planted.

I. For ornament.

II. For shade and shelter.

III. For fuel.

IV. For fencing and industrial purposes.

V. For climatic purposes.

VI. For profit.

We shall in this paper only speak of planting timber for ornament and profit. No one will dispute us when we put a claim to the fact that trees are the most comely objects a person can place about his home. There is no object in nature so beautiful as a tree. We mean one that has a chance to grow into a tree—one that has had somewhat its own way—one that has not been mutilated with saw or knife. We have all seen such trees by the wayside, on the common or in the open field, standing erect, with short, straight trunk and dense symetrical head.

Perhaps very few farmers have considered the subject sufficiently to determine whether timber can be grown for profit. But in the West, where timber is scarce, nearly every one who opens a farm, at once plants a few trees for ornament. Of course it would be quite difficult for one who has spent his best days in clearing a farm, and who has exhausted his muscular

power in grubbing roots and stumps, to see any profit in timber. He has been in the habit of looking upon trees only as an incumbrance. But the settler upon the western prairies looks upon the subject from a different standpoint. He sets about planting trees somewhere; but how often these first plantations fail; and how often they are set without taste or order. Nearly everybody can set trees in a straight line; perhaps a row along the fence about the front yard, then another straight row on either side of the drive-way or path, which usually leads from the highway to the front door. (sometimes the more prominent figure on the farm, the barn). This kind of ornamentation is very common. Most everyone is an adept in this kind of landscape gardening. But to give real grace and beauty and comliness to a house by the help of trees, to somehow impress it with the beautiful, so that whoever looks upon it will himself be impressed and inspired by the scene before him, is perhaps a rare talent. One passes house after house surrounded by trees; but it is only occasionally that the eye is pleased. There may be beautiful trees, but there is something about their arrangement that knocks all the ornament out of the landscape. Often we see a costly house; but there is something about the architecture that destroys its beauty, and the value of that property is depreciated. Just so in planting trees for ornament. There may be a profusion of costly trees; but the value of that property may be greatly inhanced or depreciated by the skill or lack of skill in him who lays out the grounds. As there are only a few men who are born poets, so there are only a few born landscape gardeners. One tree is in itself an ornament. But to place a number of them so that the whole mass of them that are grooped about a house, shall be an ornament, is no small undertaking. It is therefore quite clear that to plant trees for ornament, is to plant also for profit.

We are apt to everlook this point. He that plants one tree in his door-yard and causes it to grow, enhances the value of his preperty. The value of an article is always increased by increasing its demand. Let him, therefore, who plants trees about his house, give attention to a little art in grooping and arranging of his plantation and he will create a demand for his property. It will be more saleable. If one builds a property to rent, it will rent more readily, and command a higher rent when it has a graceful plantation of trees. If he build to sell, trees will give it a ready sale at a considerable advance over the property that has no trees. If you build a house for yourself, plant trees, it will make home pleasant and attractive to your children. Encourage your children to plant trees and they will, in after years, feel a deeper interest in the "old homestead," and it will have greater money value as an inheritance to bequeath to your heirs. Therefore, we repeat: *always plant trees for profit.* But there is another feature in growing timber

for profit, will it pay a farmer to plant trees as he would plant a crop of corn, to be harvested and marketed? We purpose to show that to plant groves is a profitable industry. At the present rate of consumption, in ten years from this, the value of timber will be greatly enhanced; and consequently the price of all kinds of timber must advance. It is estimated that there is, at present, a sufficient amount of white pine growing in the United States to make 80,000,000,000 feet of lumber, and that 10,000,000,000 feet are cut annually. At this rate it is quite plain that in ten years from now our pine lumber will be all marketed; other valuable timber is being consumed in the same ratio. If forest fires should continue their distructive agency, our lumber resources will be cut off in a much shorter period. The last census shows that in 1880, 13,899 acres of land were burned over in Massachusetts, the loss being given at over $100,000. In Pennsylvania, where the lumbering interest is second only to that of Michigan, 685,738 acres are reported burned over during the same year, with a loss of over $3,000,000. In view of these interesting facts, pine lands are rapidly advancing in value. The publication of these facts a few months ago, has already, in some cases, more than double the price of pine lands.

Hence, in those portions of our land where white pine will grow it will be easy to see that white pine plantations must eventually be profitable. In some parts of New England the spontaneous second growth of pine has been growing for a considerable time and has already given rise to large and profitable industries. The value of logs cut in Massachusetts in 1880 reached nearly $2,000,000. At least one-half of these logs were of second-growth pine. More than 100,000,000 feet of second-growth pine were sawed during the same year in Vermont and New Hampshire, and nearly, if not quite as much ih Maine. A person in advanced life might not be able to cut saw-logs from a pinery of his own plantation, but he could perhaps plant nothing that would so enhance the value of a worn out farm as a grove of white pine, which would sell and furnish him a handsome competency to carry him through his retiring years.

Prof. Budd of Iowa says: "A grove of ten acres of white ash, thinned to six feet each way, containing twelve thousand trees, at twelve years were eight inches in diameter and thirty-five feet high, the previous thinning paying all expenses of planting and cultivation. Ten feet of the bodies of these trees were worth, for making bent stuff, etc., forty cents each and the remaining top ten cents, making a total of $6,000 as the profit of ten acres in twelve years, or a yearly profit of $50 per acre. It is quite plain that in regions where white ash succeeds it is one of the trees to plant for profit. Of the trees to plant for profit in the latitude of Missouri and Kansas I shall mention only five, viz: Black walnut, catalpa, speciosaailanthus,

honey locust and black locust. These are named in the order of their importance. These will snceeed over so large a range of territofy that they may be regarded as almost universal trees—the trees for the millions. From observations made on actual plantations we learn that these varieties succeed even in Western Kansas. There are localities in Kansas and Missouri where in twenty years, from the seed, walnut trees will grow large enough for two railroad ties. Either of the other varieties will grow large enough in ten or fifteen years to make at least one railroad tie each. From five to seven hundred of such trees can be grown to the acre.

We are safe in predicting that in fifteen years from now railroad ties will be worth $1 each. There will not be less than $600 per acre, not counting the tops and stumps of the trees. These trees may be planted four feet each way, which will make 2,700 trees to the acre. This will give 2,000 trees to be thinned out from time to time, as the density of the grove may require. These thinnings will pay for all the cost of planting and cultivation. The tops and stumps will pay for preparing the ties for market. But we may add $100 for the expense of marketing the product and still have $500 as the net profit. At these figures a forty-acre plantation would yield a net profit of $20,000 in fifteen years from planting, or $33 an acre per year.

Forty acres of timber could be so distributed over a 160-acre farm in belts and clumps that in reality it would not interfere very materially with the tillable portions. In Kansas, where the prevailing winds in Summer are from the south, belts of two and three rods wide could be planted on the south side of the fields. The protection such belts would give to growing crops, would, in a measure, compensate for the land thus occupied. Timber should always be planted close, for the reason that more can be grown to the acre when planted close; and it will grow straighter and taller. The ground need not be cultivated so long. From three to four years' cultivation is quite sufficient when trees are planted four feet each way. It never pays to grow crops on a plantation of forest tree, for the roots will very soon so sap the ground that the yield will be very unsatisfactory. The trees will themselves pay better than any crop that can be grown between the rows. A good rule for planting timber for profit is to plant so close that there is no room to grow any other crop. The object is to grow all the wood you can on an acre.

Single rows distributed over different portions of the farm, though better than nothing, will not pay; they will sap more soil than the same number of trees planted in close belts or clumps, and at the same time they will not furnish the kind of protection sought for. It is a fact worth remembering that corn-fields lying north of timber were not damaged by the hot winds last September, as were those that did not have such a protection.

In conclusion, I would say that there is not a single aspect of this whole subject which does not point directly to a handsome profit. And this is, therefore, the pivot on which the whole subject revolves. This is the point that must be kept in view, in urging the question of tree planting upon the people.

PLANT GROWTH.

BY B. G. GALLOWAY, JUNIOR CLASS MISSOURI AGRICULTURAL COLLEGE.

A plant is an organized body, endowed with vitality but not with sensation, composed of distinct parts, each of which is essential to the completion of its being.

A seed is a living body, separated from its parent and capable of growing into a new individual of the same species as that in which it originated. but it will not always reproduce any peculiarities which may have existed in its parent.

The recommencement of growth in the seed is called germination. The conditions requisite for germination are: Moisture, air and warmth. Moisture is necessary for softening the integuments, dissolving the nutritive matter and facilitating its circulation. Air, or rather its oxygen, is required for the conversion of the starch into sugar; the oxygen absorbed unites with a portion of the carbon of the starch, producing heat, evolving carbonic acid. Warmth is a requisite condition of all vital action. The degree of heat seeds find most conducive to their germination varies in different species. Extremes of heat and cold are not fatal to all germination.

In its earliest stage of life the plant is an embryo, sleeping in the seed. It then consists of two parts, the radicle or rootlet and the plumule. Besides the embryo the seed contains also its food, in some form provided for its first nourishment.

When germination has taken place the radicle turns downward, seeking the dark, damp earth, avoiding the air and light and forms the root or descending axis.

The plumule, taking the opposite direction, ascends. seeking the air and light and expanding itself under their influence. This constitutes the stem or ascending axis bearing the leaves.

At first the ascending axis is merely a bud. That is a growing point clothed with and protected by little scales, the rudiments of leaves. As the growing point advances and its lower scales gradually expand into leaves.

new scales successively appear above. Thus the axis is always terminated by a bud.

By the growth of terminal bud the axis is simply lengthened in one direction; but besides this, buds exist ready formed in the axis of the leaves, one in each. These axillary buds, a part or all of them, may grow and develop like the terminal bud, or they may always remain dormant.

In growing they become branches, and these branches may in turn generate buds and branchlets in the axils of their own leaves, in like manner. By the continued repetition of this simple process the vegetable fabric arises, ever advancing in the direction of the growing points, clothing itself with leaves as it advances and enlarging the volume of its axis, until it reaches the limit of being assigned by its creator. In the next stage of vegetation a change occurs in the development of some of the buds; the growing point ceases to extend itself as hitherto and still remains a point, expanding its scales in crowded whorles and departing more and more from the original type, the leaf.

Thus, instead of a leafy branch, the ordinary product of the bud, a flower is the result; hence, a flower may be considered as a transformed branch, moulded into more delicate form and tinged with more brilliant hues. Lastly comes fruit-bearing, for which the flower has prepared the way; the work and bloom of the flower are soon accomplished, its decidious parts fall and the remaining energies of the plant are directed to the development of the fruit.

We have now briefly surveyed the mechanism of the plant. We next inquire into the uses of this wonderful apparatus; what the specific office which each part performs. The principal office of the root is to attract food from the ground. For this purpose it is terminated with an extremely delicate point or spongelet, which is capable of absorbing whatever matter of a suitable kind that may be in its neighborhood. The root is extended much in the same way as an icicle, with this difference: An icicle is augmented by the addition of matter from without, while the root lengthens by the creation of new form matter from within.

The office of the stem is to convey the crude fluid obtained from the soil and called sap into the leaves for elaboration, and then to receive it back again.

The sap which first enters the stem, consists largely of water containing, in solution, minute quantities of gases and mineral salts. In its course to the leaves, the sap gains in density. There arrived, it loses by exhalation, a large part of its water. The stem of a plant consists of the following parts, viz:

1. Wood, the oldest of which is hart-wood and the newest, alburnum. and this latter is the substance through which sap ascends.

2. Bark, the external coating, down the liber or iner face of which sap descends.

3. Pith, a central portion of the horizontal system; and

4. Medulary rays serving to connect the rind with the pith.

The returning sap distributes its treasures in due and exact proportions. as needed to every organ. The residue, often the richest legacy of all, falls to the root and fills every branch and fibre. Since the flowing of the true sap is downward, it scarce admits of a doubt that the progress of the growth is also downward from the leaves to the roots.

A leaf is an appendage of the stem of a plant, consisting of an expansion of the cellular rind into which veins are introduced, and enclosed in a skin through which respiration and perspiration takes place.

It is in reality a natural contrivance for exposing a large surface to the influence of external agents, by whose assistance, the crude sap contained in the stem is altered and rendered suitable to the particular wants of the species. In a word, the leaf of a plant is its lungs and its stomach, traversed by a system of veins.

Thus, we see, that a plant consists of roots to absorb its food, stem and branches to transmit it, and leaves to digest it; but the great Creator required that each plant should have its seed within itself, for the perpetuation of its kind.

The flower is the immediate agent in the production of the seed with its embryo, and to this end its whole structure is designed. The floral envelopes are, first, the calyx, which is usually green, and always the external part: second, the corolla, which is usually gaily colored. Each of these consists of leaves called sepals in the calyx, and petals in the corolla.

In the middle of the flower stands the sexes, called stamens and pistil. The pistil occupies the center and the stamens surround it, except in flowers where each sex is central in its own flower.

The stamens consists of a filament and an anther; in the inside of the latter is secreted a powdery substance called pollen. The pistil consist of ovary, style and stigma, in the inside of the first of which are ovules or basis of young seeds.

The use of calyx and corolla is too uncertain and unimportant to demand much notice. The use of the stamens is to effect the fertilization of the young seed contained in the pistil. The pollen of the anther must be applied to the stigma, the result of which is that an empryo, the rudiment of a future plant is generated in the inside of the young seed.

The period when a plant begins to flower, depends upon the presence in its system of a sufficient quantity of secreted matter fit for the maintainence of the flower when produced. It is often in the power of man to advance or retard these periods, artificially.

Whatever produces excessive vigor in plants is favorable to the formation of leaf-buds, and unforable to the production of flower-buds. Such circumstances as tend to diminish luxurance, and to check rapid vegetation without affecting the health of the individual, are more favorable to the production of flower-buds than of leaf-buds. After the fertilization of the seed has taken effect, the pistil by itself, or the pistil and surrounding parts, goes on growing, alter their appearance as well as size, acquire new qualities of color, texture, flavor, etc., and become the fruit.

Of the food consumed in the maturation of the fruit, a portion is drawn from the atmosphere, and a part is prepared by the leaves, which obtain it from the earth through the roots. Consequently, whatever contributes to the healthy condition of the leaves, and roots will have a directly beneficial influence upon the fruit.

How can man control the vital actions of a plant? We may say that he can control them; first, by pruning. The object of the pruner is to diminish its number of leaves and branches. When a portion of a healthy plant is cut off, all that sap that would have been expended in supporting the part removed, is directed into the parts which remain. It is extremely necessary to perform the operation of pruning with care and discretion. The first thing to be thought of is the peculiar nature of the plant under operation, and the manner in which its special habits may render a special mode of pruning necessary. For example, the fruit of some plants is borne by wood of the same season, that of others by wood of the second season; these plants will each require a distinct plan of pruning, for fruit. In fruit trees, we prune them in their youth to give them their desired shape, and to build up their frame-work. After fruit bearing has commenced, we prune to produce fruit-bearing buds, and also to save the plant from exhaustion. Man can control the vital actions by culture. Culture has two distinct objects; first, the mechanical treatment of the soil, second, the fertilization of the soil. The mechanical treatment embraces the plowing, spading, hoeing, harrowing and draining when the soil contains a surplus of water. These have all one common object, the admission of air. Where the air penetrates, the roots will follow.

We manure the soil to make it rich in plant-food. Manures are not applied indiscriminately for every crop, but with due consideration of the object in view.

The power of propagating plants by any other method than that of seed, depends entirely upon the presence of leaf-buds. A leaf-bud is a condensed branch, all being parts developed in a miniature form. When we place a branch containing one or more leaf-buds in a suitable medium, the branch is supported by the wood until the vital actions are started.

The wood is therefore to be placed in a medium which offers moisture enough but not in excess. In cuttings made of green wood some of the leaves are usually left on in order to support vital action until the roots are formed. As far as physiology can explain, the operation of propagating by cuttings, it appears that roots are formed by the action of leaves; that branches are developed from the buds, and that the buds are maintained by the suitable aliment stored up in the stem.

A layer is a branch bent into the earth and half cut through at the bend; the free portion of the wound being called a tongue. The object is to induce the layer to emit roots into the earth at the tongue. With this view the branch is twisted half around so as to injure the wood vessels.

The intention of both tongueing and twisting is to prevent the return of the sap from the layer into the main stem, while a small quantity is allowed to flow out of the latter into the former. The effect of this being to compel the returning sap to organize itself externally as roots instead of passing downward below the bark as wood.

PROPAGATION BY BUDDING AND GRAFTING.

These operations consist in causing a leaf bud or a cutting of one plant to grow upon some other plant, so that the two by forming an organic union may become a new and compound individual. The objects of these operations are manifold; species which are naturally delicate becoming robust when worked upon robust stocks.

The peculiar qualities of some plants can only be preserved by budding and grafting. Fruits may be obtained by these processes much earlier than by any others.

Budding consists in introducing a bud of one tree with a portion of the bark adhering to it below the bark of another tree. In grafting no attempt is made to apply the inner surface of the bark of a scion to the outer surface of the wood of the stock. But the contact is effected by the wood of the two, and their bark only joins at the edges. In all these operations it is indispensible that similar parts should be brought as much as possible into contact, for the more completely this is accomplished the more certain is the operation to succeed. These operations can not be performed indifferently between any two species. The operations are successful only where the stock and scion are very nearly allied, and the degree of success is in pro-

portion to the degree of affinity. For instance, pears work freely upon pears, very well on quinces, less willingly on apples and not at all upon plums and cherries.

TRANSPLANTING—In this operation the plant is taken from the place where it has grown and removed to another position. Its roots are more or less injured in the process and consequently it is less able to support the stem than it was before the mutilation took place.

The importance of roots to plants is not alike at all seasons. In summer there is the greatest demand upon them, in consequence of the perspiration of the foliage; in winter when the leaves have fallen, they are comparatively unimportant.

It is the powerful perspiratory action of the leaves of decidious trees which renders transplanting them in a growing state so difficult. At no period then can the operation be performed if such plants are growing.

In taking up the plant the roots should never be exposed to dryness or frost, and it should be placed in its new quarters as soon as possible.

The stem should be cared for as well as the root. The plant should be placed so as to enable the root to absorb moisture for the stem. This is done by settling the soil tightly around the root. In evergreens the circulation, perspiration, assimulation and production of roots is incessant; such being the case, an evergreen when transplanted is liable to the same risks as decidious plants in full leaf.

Transplanting evergreens in autumn is for this country injudicious. The early spring is the most favorable period for the purpose, since the abundant and long continued rains which occur from the vernal equinox to the middle of April enables the plant to recover itself and emit roots with rapidity.

Next to the selection of the proper time, the preservation of the roots in a moist condition is the most essential point in removing evergreen and all other trees.

HORTICULTURE ON THE PRAIRIE.

BY

PROF. M. G. KERN

OF STATE AGRICULTURAL COLLEGE.

Of all the functions peculiar to vegetable economy none are more important and indispensable to a state of perfect health than those of perspiration and evaporation. The sap, continually taken up by the root, is elaborated in the green parts of the plant in leaves and bark, and a great proportion of its water is evaporated and thus returned to the atmosphere. An even balance can, therefore, only be maintained when the sap receiving and sap elaborating organs, roots and leaves are in harmonious action. Any disturbance of this balance, from whatever cause, must of necessity be injurious to the well being of the plant, curtailing its growth and diminishing its fruitfulness.

Perspiration takes place in sunlight, and is increased in the ratio of the intensity of the sun's rays; but is on the other hand greatly balanced by the degree of moisture present in the surrounding air. In an atmosphere devoid of moisture it is therefore strongest and is often continued to such an extent as to cause the green parts of the plant to wilt and finally to dry up altogether. Plants die of drought by evaporating their sap, while the root is unable to keep up an even supply out of the parched soil.

Wind increases the dryness of the atmosphere and in consequence the perspiring and evaporating functions of the plant. This drying process is in direct relation to the velocity of the wind. It is stated by high authority in physiological science that the same surface which in a calm state of air would exhale 100 parts of water, would yield 125 parts in a moderate breeze and 150 parts in a high wind. The importance of this factum in vegetable economy to a country rocked almost continually, either gently or violently, by the winds of heaven, as our prairies are, must be convincing to every reasoning mind.

Any obstruction to the free sweep of the wind is in consequence a diminition of undue or injurious evaporation and a safe guard to plants growing in a position directly protected by the barrier. Forests exercise, therefore, a most powerful influence on the productive capability of a country; their absence causes a most remarkable difference in the climate and in consequence in vegetation.

With these plain axioms of vegetable physiology before us, we can readily account for the many fold advantages possessed by districts favored with a genial degree of atmospheric moisture, and with the protecting influences of forests felt in many ways by the tiller of the soil. No extra allowance of intelligence is required on the other hand to perceive a potent reason why barriers against the preventing winds are indispensably necessary to an enlightened system of both agriculture and horticulture on the treeless plains of our country. Each spot of ground on which a homestead is erected, around which the toils of agricultural industry are steadily expended, should have its protecting forest belt beneath whose friendly boughs both man and beast would enjoy a moderated climate, and under whose immediate protection the choicest fruits and largest crops would be raised.

The famous plains of our continent, our fertile prairies, have been conquered and subjugated in a marvelously short space of time by Ceres and Pomona, the lovely goddesses of the American husbandman. The virgin wilderness has been transformed as by magic into fields and gardens unequaled in fruitfulness by any country of the globe. A pioneering generation has broken the pathway undaunted by the windy blasts of the climate and by the absence of the forests of their former homes. The earliest settlers have accommodated their modes of agriculture and their ways of living to the stern necessities enjoined by the climate and surrounding circumstances. Some of the wisest and farthest seeing ones have planted and reared from the beginning of their sojourn on the prairie the groves and home forests of both shade and fruit bearing trees, which greet and gladden the eye in all directions. Wonderful results have been achieved in this direction by enterprising individuals and communities, yet compared with the multitude of ommissions of this timely and rational enterprise painfully visible everywhere, and with the magnitude of the task yet to be performed, these shady oases on the sunny face of the treeless prairie are only indications of a new and more enlightened agricultural era which is now plainly dawning on the Western horizon of our country. The race of sturdy pioneers is to-day superceded by a teeming population, spread over wide extended plains and congregated in important cities and pleasant towns and villages. This modern generation is trying hard to enjoy life on the prairie to its fullest possible extent. Of many ways in which their desideratum might be secured

we mention in this connection but one well meant advice, namely: Surround your homes, your farms and your towns with groves, living barriers against the storms, which everywhere beset you. Counteract the excesses of the climate by judicious forest planting, and one important step to comfort and increased health is accomplished. Favored by the unlimited richness of the soil dame horticulture has extended her efforts in all derections. Fruits of the highest excellence have thus become the normal product of the Western prairie. Unnumbered varieties and kinds of fruits have been tested as to their adaptibility to the prairie soil and climate. Each prairie State has its horticultural organization which disseminates the most reliable information amongst the people. Most of this valuable knowledge, however. is confined to facts established by experience made and collected only under the ordinary prevailing conditions of the climate.

The most far-seeing cultivators have long adopted the principles of protection to the orchard, to the field and to the home grounds, and have demonstrated by solid facts, the beneficial results attained by these natural, though artificially created barriers. And their experience, aside from a truly scientific point of view, opens a new vista into the future possibilities of prairie horticulture. The art, or rather the true science of horticulture, does not come to a standstill at a point where the climate blockades the pathway of culture. It is here, indeed, where its intrinsic value comes to a telling test, by the adoption of artificial means by which obstacles are counteracted, modified. and in many instances, conquered.

Take as a parallel to the assertion, the history and present state of horticulture of European countries, from which we have derived many lessons quite valuable for this country. Julius Cæsar while conquering Germany seat to Rome, a discouraging report of the rigid climate of the valley of the Rhine. How little have his predictions been verified these many centuries past. What else but culture under protection against the climate, has ever produced the vines and fruits of that famous land? The world-renowned horticultural products of France and Germany, are not raised on open, windy fields, but on the most protected sunny hillside of those countries.

The climate of England is damp, cool and gloomy, unsuited to the growth of many fruits growing spontaneously in the United States. But is their culture therefore given up as a hopeless task? By no means. It is here where English horticulture steps in and produces these very fruits, not in glass houses by any means, but in the open air under protection of barriers against the inclemencies of the climate. The vine, the peach, the apricot. fig and pear are thus grown to full perfection. Trained on walls and high fences which stop the prevailing wind of the country, and reflect the spare

rays of the English sun, sufficiently to ripen fruits, which, in open situations, would simply be out of question.

The European fruit garden is by no means a parallel to the prairie orchard, a play-ball to every stormy wind that may chance to blow, but a well protected, retired space of ground, secured as far as possible from outward influences.

As like causes produce like results, so are the facts established by experience on both continents, intrisically the same. It is in no wise pretended that the extensive, even stupendious system of fruit raising or fruit farming, as in vogue in our country, can material be modified, suddenly, by means requiring years of growth, to call them into full existence, yet, in many cases, great benefits may be secured to horticulture by the timely planting of timber belts on the stormy sides of the orchards.

The benefits arising to her horticultural enterprise by a judicious system of forest culture, in connection with orchard culture, are too apparent to each thinking mind. The first will prove a faithful helpmate to the latter. The sheltering, nursing influence of fast growing forest trees, exerts a most powerful agency upon the weaker and more delicate kinds, unable to stand the hardships of the open prairie, alone and unaided by the cultivator's special care.

The principle of nursing the weather by protection rendered by the stronger, finds its full application in the culture of evergreens on the bleak prairie. So numerous have been the failures in that direction, that many have given up the task as hopeless and invalid. The value and necessity of sheltering trees, retaining a dense foliage during winter, is so great that no effort should be spared to introduce them universally everywhere. Enlightened and progressive horticulture is in duty bound to solve this problem, and to overcome all obstacles. It has a higher mission than to submit willingly and blindly to the discords of the climate.

The writer will not attempt to mention here the many plausible excuses advanced by many, why this important work of prairie agriculture is so sadly neglected in so many cases, nor will he try to analyze the strange delusion that only fruit-bearing trees, or bushes, are worthy of the farmer's special culture.

This specie of selfishness and ignorance is difficult to overcome by argument alone, and deserves to be buried out of the sight of an intelligent people. To the individual, rather, the ultimate objects of horticultural pursuits, have always been, and will ever be, renumerative returns for labor done and capital invested. Whatever tends most directly to the safe and speedy attainment of this end, is popular and interesting to the majority of cultivators. The importance of forest culture in close connection, hand in

hand with fruit culture, once fairly recognized, and openly conceded and advocated a new epoch in Western horticulture will arise, by which benefits incalculable at the present day would be secured, and which the scenic aspects of the prairie states would be happily revolutionized.

In the fullness of time, this new era will arrive, and horticulture will assume the role of a grand commanding movement which helps, not one, but all mankind.

BULLETIN NO. 1.

"A science can grow only by the observation of individual facts."—BACON.

AGRICULTURAL COLLEGE FARM,
COLUMBIA, MO., January 3, 1883.

When the work already inaugurated, or on point of inauguration, at the State Agricultural College Farm, has had time to give its answer, it is proposed to issue a monthly bulletin of results. It is intended that the experiments carried on shall cover those practical problems of the farm that effect the economy of its operations, and thereby aid in increasing its revenues. The public rightly demand that Agricultural Colleges shall do work, aside from that of the school room, that shall be of public utility. This expectation is attended by the right of the Colleges to look for aid from the public for prosecuting such work. Our College farm has received no State aid, while it is entirely without means of prosecuting the work desired, either in funds or appliances. Recognizing the great value of supplanting conjectures, by facts, in agriculture, the situation has been temporarily forced in organizing several experiment trials. We ask popular sentiment to justify State aid for this work. It is deemed a misfortune that the first Bulletin needs to be commenced in this manner; yet the farm and its management are clearly entitled to the benefit resulting from the knowledge by the public, for whom the work is done, of the poverty of the situation.

EXPERIMENT.

Four sets, of four in a set, of year old shoats were weighed October 13th, and put up to feed in separate lots with weighed rations, for the following purposes, namely, to note the results of exercise in fattening shoats, the value of ground corn as against whole corn; and of corn and cob ground together, against clear corn meal. The only available grain mill, with which to grind the corn, was one of the ordinary horse power mills or crushers. This mill turned out a very coarse meal, or fine cracked corn with some meal.

In the absence of old corn, new was fed. It is to be expected that new corn will give relatively better results, against new corn meal, than old corn, against old corn meal.

Set 1 were allowed to run at large and graze in a 4 acre lot. The other lots were confined to pens.

Feed of lot 1—whole corn and grass.

Feed of lot 2—whole corn.

Feed of lot 3—clear corn meal.

Feed of lot 4—cob and corn ground together.

Sets.....	Weight Oct. 13.	Weight Nov. 13.	Gain in 31 days.	Lbs. food eaten.	Food required for lbs. gain.	Gain per 100 lbs. food.	Value per bu. corn live pig 7c.	Cost per lb. gain.
No.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	Cts.
1	632	953	321	1,335	4.16	24 3-10	94 2-10	2 6-10
2	600	920	320	1,207	3.77	26 5-10	103 5-10	2 3-10
3	641	909	268	1,253	4.67	21 7-10	83 3-10	3 7-10
4	650	834	184	1,185	6.44	15 5-10	60 8-10	3 9-10

It will first be noted that there is an enormous profit shown in this period of feeding. The price of fat hogs used is that given at the time of the trial. and larger than is now paid, yet the columns of cost of a pound of live pig show that, at the present price, corn condensed into pig brings over twice as much as upon the market. This same price for live fat pigs is used in the next feeding trial, that the figures may remain relative. Secondly, it will be noticed that the shoats running at large and consuming grass, gave no returns for the grass, and scattered their excrements where not desired. This is deemed important as the farm needs fertilizing. They lost in exercise all they gained in grass feed. It should be noted that the grass was fresh and green, here, at this period. Thirdly, I was disappointed in the results of grinding, although little was expected of the coarse grinding given.

SECOND PERIOD OF THIRTY DAYS.

I succeeded in finding an owner of a burr mill driven by steam which would grind down fine, as for family use, our corn, both the whole corn, and the corn and cob together.

Sets.	Gains in 80 days.	Lbs. food eaten.	Food required for lb. gain.	Gains for 100 lbs. food.	Value rec. per bushel.	Cost of lbs. gain.
No.	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	Cts.
1	207	1,232	5.95	16.8	65.87	3.71
2	178	1,123	6.30	15.8	62.16	3.93
3	245	1,329	5.42	18.4	72.31	*4.35
4	180	1,140	6.33	15.8	62.16	*3.78

THIRD PERIOD OF 17 DAYS—FED AS BEFORE.

1	76	482	6.34	15.7	61.53	3.96
2	96	534	5.56	17.9	70.49	3.47
3	125	614	4.91	20.3	79.80	3.94
4	92	568	6.17	16.2	63.19	3.85

First, it will be noted that during the second and third period more food is required to make a pound of growth than during the first period. This fact may be ascribed to three reasons: approach of maturity, colder weather, and removal from first effects of change from grass to full corn feed, although the shoats were on nearly full corn feed before the commencement of the experiment.

Secondly, it will be observed that the fine ground feed did very notably better than the coarse ground feed of the first period, and that for sections where corn is high, or in seasons of high prices, grinding pays. It gives no profit when corn is rated as above, at 35 cents per bushel when fed green, but might when fed after one year of housing, or when well dried.

Thirdly, very meager returns are received for the cob of the ear when fed to a fattening pig. This is contrary to several results received by me at the New Hampshire Agricultural College farm, where, for a growing pig, 100 lbs clear corn, on an average, gave a gain of 28.7 lbs growth, and the corn and cob ground together gain 28.5 lbs. I have never found cob meal as valuable for fatting pigs as for growing pigs.

It was found, in feeding, that the corn-fed pigs drank very much more water during the first period of the trial, and only a little more during the final period. I have thought that the meal fed pigs would give a greater per cent. of dressed carcass than the whole corn fed pigs. This matter, and

(*) In estimating the cost of a pound of gain with the ground feed, the cost of grinding and carrying to mill is estimated.

others, I desired to have introduced could not be for want of opportunity. These trials, with the growing pig, and with a large range of food materials, will be carried on in the future.

The details of the above experiment were carried out by Levi Chubbuck, B. S., graduate of the Agricultural College, class of '82, into whose hands the matters to be tested were given. He is Superintendent of the farm.

J. W. SANBORN,
Professor of Agriculture.

The following experiments were taken from the Secretary's reports, while manager of the New Hampshire Agricultural College farm. It is thought that they may have an interest in connection with the preceding trial, as they were all made by one party and at two points.

CHAP. XI.—VALUE OF FOODS.

I inclose the third annual report of experiments in pig-feeding, made not for the purpose of ascertaining how rapid or cheap growth could be obtained, but rather to test the comparative feeding value of the different foods employed. If they had been managed for the express purpose of rapid and cheap growth, better results undoubtedly should be obtained. The pigs used were the ordinary stock of the neighborhood. From better bred pigs better results might be expected. As the results obtained are better than estimates usually made, I name the above facts as encouraging evidence that pig-raising, as a source of cheap and valuable manure, should receive more of the attention of our farmers. If it can be shown that manure can be obtained for attendance on pigs, then by purchase of foods and rearing pigs an unlimited amount of manure is at cheap command.

Four lots of two pigs each were fed. The pigs were all from one litter. After feeding a fortnight to wean and accustom to grain, they were weighed at six weeks of age, and put into lots; lot 1 of 62 pounds, feed cob meal; lot 2 of 62 pounds, feed clear corn meal; lot 3 of 61 pounds, feed middlings; and lot 4 of 60 pounds, feed meal and middlings in equal parts by weight. Thus we have fair conditions for an experiment: eight pigs of one litter, in lots of similar weights and well weaned. They were a cross of a Poland China boar on a grade Chester White sow. The cob meal fed is but part of a series of experiments (commencing with cows for milk and butter) to determine the value of cobs in cob meal from whole ears of corn.

Lot 1 consumed for 50 days, 318 pounds of cob meal and 286 quarts of skim-milk; gain, 131 pounds.

Lot 2 consumed for 50 days, 337 pounds of clear meal and 286 quarts of skim-milk; gain, 135 pounds.

Lot 3 consumed for 50 days, 304 pounds of middlings and 286 quarts of skim-milk; gain, 146 pounds.

Lot 4 consumed in 50 days, 247 pounds of middlings and corn meal and 286 quarts of skim-milk; gain, 118 pounds.

Assuming, from previous experiments with pigs of the same age, that it requires twelve quarts of skim-milk to make one pound of growth, and subtracting the growth thus made from total growth, and we have the following figures for the gains given, viz.:

Lot 1, growth per 100 pounds of food 33.6 pounds; cost per pound of growth, 2.34 cents.

Lot 2, growth per 100 pounds of food, 32.9 pounds; cost per pound of growth, 3 cents.

Lot 3, growth per 100 pounds of food, 40.1 pounds; cost per pound of growth, 2.5 cents.

Lot 4, growth per 100 pounds of food, 38 pounds; cost per pound of growth, 2.6 cents.

The cob meal is rated at eighty cents per hundred pounds, and the meal and middlings at one cent per pound. It was cheaper at the commencement of feeding and higher at the close. I bought mostly before the rise, and sold the pigs before the rise in the price of pork, or for four cents per pound, live weight.

CHANGE OF FOOD

to ascertain whether the difference in growth was the result of kind of food or the character of the pigs. The skim-milk was continued during thirty-two days of this period, and then withdrawn for other purposes. It was given at first because I had no other purpose for it. Its presence in the food would effect slightly the proportions of flesh, fat and heat formers. Yet the change of food would check the slight difference that would occur, or it would place each lot under the same relative foods.

Lot 1 consumed in 32 days, 272 pounds of clear meal and 193 quarts of skim-milk; gain, 79 pounds.

Lot 2 consumed in 32 days, 280 pounds of cob meal and 193 quarts of skim-milk; gain, 78 pounds.

Lot 3 consumed in 32 days, 299 pounds of meal and middlings and 193 quarts of skim-milk; gain, 100 pounds.

Lot 4 consumed in 32 days, 245 pounds of middlings and 193 quarts of skim-milk; gain, 87 pounds.

Estimating as before (allowing sixteen quarts of skim-milk for one pound of growth), and from grain:—

Lot 1 grew per 100 pounds of food, 24.6 pounds; cost per pound of growth, 4.1 cents.

Lot 2 grew per 100 pounds of food, 23.5 pounds; cost per pound of growth, 3.4 cents.

Lot 3 grew per 100 pounds of food, 29.4 pounds; cost per pound of growth, 3.4 cents.

Lot 4 grew per 100 pounds of food, 30.6 pounds; cost per pound of growth, 3.3 cents.

Average gain per 100 pounds cob meal, to date, 28.5 pounds; average cost, 2.9 cents per pound.

Average gain per 100 pounds clear meal, to date, 28.7 pounds; average cost, 3.5 cents per pound.

During the next fifty days of feeding, one pig in the cob-meal lot was crippled in his hind legs so that he did not eat well. He recovered so that during the fattening period, when both lots were fed on corn meal, either lot gained very nearly exactly alike per pound of food eaten. His trouble cannot be ascribed to cob meal. This lot will be dropped from the list.

THIRD PERIOD.

Feed as before, excepting skim-milk, omitted:—

Lot 1, feed corn meal for 49 days, ate 425 pounds; gain, 98 pounds; gain per 100 pounds of food, 23 pounds; cost per pound, 4.3 cents.

Lot 3, feed meal and middlings for 49 days, ate 470 pounds; gain 133 pounds; gain per 100 pounds of food, 28.3 pounds; cost per pound, 3.5 cents.

Lot 4, feed middlings for 49 days, ate 489 pounds; gain, 115 pounds; gain per 100 pounds of food, 23.5 pounds; cost per pound, 4.2 cents.

This is the first instance in three years of experiments in pig-feeding when meal and middlings mixed gave better results than middlings alone, and this only for one of the three weighings. Again, at no time has the difference in favor of middlings over meal been so slight. The period following this all of the lots were fed on corn meal for fattening, and this lot that had had middlings did worse comparatively than on middlings; one of the lot crippled and fed light, gaining nothing; and, although they had eaten well previously, or during the period just figured, yet it would seem that the cause that resulted in the disease of his limbs had previously impaired his digestive or assimilative organs.

Average gain from first period to date per 100 pounds of corn meal, 28.6 pounds; cost per pound of gain, 3.8 cents.

Average gain from first period to date per 100 pounds of middlings, 31.4 pounds; cost per pound of gain, 3.3 cents.

Average gain from first period to date per 100 pounds of meal and middlings, 31.9 pounds; cost per pound of gain, 3.16 cents.

If the last period is excluded the middlings will stand first.

Average gain for three years per 100 pounds of middlings, to grow a 200-pound pig (live weight), 28.4 pounds.

Average gain for 3 years to grow a like pig per 100 pounds corn meal, 26.1 pounds.

I should name that Northern corn instead of Western was fed this year, and that the difference is also less between the values of middlings and corn meal. When it is considered that the manure from a ton of middlings is worth twice as much as from a ton of corn meal, the advantage of using middlings for growing pigs will stand out stronger. The average for the three years shows middlings to be nearly nine per cent. more valuable for growing pigs than Indian meal. I am satisfied that middlings are not less than fifteen per cent. more valuable than Western meal as food for the growing pig. The superior value of middlings for pig-growth, it seems to me, is now sufficiently shown.

The striking advantage of feeding the cobs of the corn ground with the grain needs further investigation. It should be stated that fourteen pounds of cob meal were added to fifty-six pounds of corn meal.

FATTENING PERIOD.

Lot 1, weight 450 pounds; gain for 29 days, 80 pounds; consumed 347 pounds; gain per 100 pounds of food, 23 pounds.

Lot 2, weight 415 pounds; gain for 29 days, 75 pounds; consumed 318 pounds; gain per 100 pounds of food, 23.4 pounds.

Lot 3, weight 530 pounds; gain for 29 days, 90 pounds; consumed 389 pounds; gain per 100 pounds of food, 23.1 pounds.

They were all fed on corn meal (Western for this period). These figures serve to show the uniform capacity of the lots for growth.

Since writing the above I have seen the results of an experiment by a committee of two farmers' clubs of Connecticut, in feeding cob meal against clear meal, that fully corroborates my results with these two foods; also an indirect corroboration of it by Prof. W. Stewart, in feeding pigs cut clover in small quantities, mixed with meal. Both experiments as reported appear to have had careful management. The good results of Prof. Stewart's experiment with clover and meal against meal alone were ascribed to the effect of

clover as a divisor of the meal, thus preventing the impacting of the meal in the stomach and allowing the free access and action of the gastric juice. Cob meal would, in a measure, perform the same office. Many recent analyses of cobs by several American chemists have been made, and they all concur in finding a heavy per cent. of digestible carbo-hydrates in them. I will give the results of the experiments by the farmers' clubs. Four and three-fourths pounds clear meal made a pound of shoat; 4.63 pounds cob meal, or, reduced to clear meal, 3.70 pounds, made a pound of growth. A bushel of clear meal made 12.90 pounds of growth, and the cob meal that it would require to make a bushel of clear meal made 15.11 pounds of growth. Estimating the growth from 100 pounds of food, and the clear meal made 21 pounds and the cob meal 21.5 pounds. Comparing these figures with the growth received, and a great difference in favor of the college-farm pigs is seen. It is the difference in favor of a young pig over a shoat for economy of growth. This point should never be lost sight of by the feeder. These corroborative experiments go strongly to prove that cob meal can be fed to great advantage to pigs. I propose, however, to continue the experiments until proof is satisfactory. Some suggestions occur that will better bear review when the proof is clear beyond question.

CHAP. I.—FEEDING PIGS.

I give the somewhat broken results of a partially successful attempt at pig-feeding, believing that some of the facts noted will not be entirely without interest to many: —

Lot 1, consisting of two fall shoats, weighed, April 16, 215 pounds. Feed, cob meal.

Lot 2, consisting of two spring pigs, weighed, April 16, 47¾ pounds. Feed, cob meal.

Lot 3, consisting of two spring pigs, weighed, April 16, 51¼ pounds. Feed, clear corn meal.

Lot 4, consisting of two spring pigs, weighed, April 16, 48¾ pounds. Feed, meal of cobs, three parts to one of mixed fish and cotton-seed meal.

Lot 5, consisting of two spring pigs, weighed, April 16, 47¾ pounds. Feed, bran.

Weight of lot 1, June 9, 377 pounds; consumed 674 pounds.

Weight of lot 2, June 9, 75 pounds; consumed 185 pounds.

Weight of lot 3, June 9, 107 pounds; consumed 235 pounds.

Weight of lot 4, June 9, 70 pounds; consumed 174 pounds.

Lot 1, pounds of food to make one of growth, 4.16.

Lot 2, pounds of food to make one of growth, 6.7.

Lot 3, pounds of food to make one of growth, 4.9.

Lot 4, pounds of food to make one of growth, 7.8.

I have noticed in former experiments that coarse food, hard of digestion, is entirely unfitted for young pigs, and that the change of any animal from a better to a poorer food is followed by small consumption and light growth. The scales have repeatedly demonstrated the fact; and, as no good can come of such an attempt except as a warning to others, I shall in future work avoid both mistakes. It is not an infrequent habit of farmers to change both neat stock and sheep, as well as pigs, from good to poorer foods, and by some to feed young animals on coarse foods. I have usually changed food in experiments to note whether one set of the animals under experimental inquiry was not better growers than the other. The objection noted is so strong as to overcome the object sought. In unpublished experiments I have fed through without a change. The pigs in this experiment were fed two or three weeks after weaning to get them accustomed to other foods. The pigs in lot 5, as well as in lots 1 and 4, ate very poorly; suddenly one in lot 5 died of indigestion; all of which I expected, but desired to know just what a pig's stomach would do with bran.

It will be readily seen that the object of the first four sets was to determine whether a shoat is a more economical pork-producer than a pig, and whether corn-cobs ground are profitable to feed. This period of fifty-six days affords for these young pigs no fair test, as the low amount consumed would indicate, except in the case of lot 4 against lot 2. Of the 7.8 pounds of food eaten to make one of growth, two were fish and cotton-seed meal, costing 4 cents. The 6.7 pounds required to make a pound of growth for lot 2 cost 6.7 cents; then 5.8 pounds of cobs or meal in lot 4 returned the difference between 4 cents and 6.7 cents or 2.7 cents, or 48 cents per 100 pounds. These cobs were from corn of last season, not so soundly ripe as usual, and being in large bins not dry enough to grind fine. None of the products of last year on this farm have proved as nutritious in feeding as usual. The same fact is noted with the corn meal in this experiment, requiring more pounds to make one of growth.

Weight of lot 1, July 23, 492 pounds; ate 590 pounds; required to make one of gain, 5.1 pounds.

Weight of lot 2, July 23, 125 pounds; ate 185 pounds; required to make one of gain, 3.6 pounds.

Weight of lot 3, July 23, 170 pounds; ate 272 pounds; required to make one of gain, 4.4 pounds.

During this period our young pigs became accustomed to cob meal, and, while the gain is light, yet it is remarkable for the small amount consumed, and shows the pig to compare favorably with the shoat for pork production. Cob meal shows well against clear meal. Lot 4 had to be dropped from the

list; the food was too coarse, but will yet be shown a very economical one for older animals.

THIRD PERIOD, TO SEPTEMBER 13.

Weight of lot 1, 625 pounds; food, clear meal; ate 660 pounds, to make one of gain, 4.9 pounds.

Weight of lot 2, 187 pounds; food, cob meal; ate 281 pounds; to make one of gain, 4.3 pounds.

Weight of lot 3, 187 pounds; food, clear meal; ate 360 pounds; to make one of gain, 5.5 pounds.

Weight of lot 4, 340 pounds; food, bran and clear meal; ate 416 pounds; to make one of gain, 3.9 pounds.

Pigs against shoats and cob meal against clear meal, again make a good showing. Lot 4 is a new lot, and shows against lot 3 that bran and meal mixed, to older pigs than before, work well.

FOURTH PERIOD, TO NOVEMBER 5.

Lot 1, feed cob meal, ate 644 pounds; weight, 700 pounds; food to one pound of gain, 8.5 pounds.

Lot 3, feed, cob meal, ate 215 ponnds; weight, 240 pounds; 5 pounds gain.

Lot 4, feed as before, ate 385 pounds; weight, 410 pounds; food to make one of gain, 5.5 pounds.

Lot 1, during the previous period, had begun to lay on fat. The result of a change to a coarse food and one not adapted to fatten is seen both in lots 1 and 3.

Our shoats for the summer have eaten heartily and made a good gain per day. The pigs of lot 2 have eaten little and gained slowly, yet they have made better use of their food than the shoats. The results with the cob meal are in agreement with those of last year, and for the pig well started there can be no doubt that cob meal is more economical than clear meal.

Reviewing the experiments for the past four years leaves no doubt that it is an exceedingly wasteful practice to feed clear corn meal alone to a growing pig.

For the second and third period, allowing cob meal to be worth one cent per pound, we find the growth of lot 2 has cost 3.95 cents; I have sold them for shoats at six cents per pound. For the first and second period or for ninety days, the growth of shoats cost 4.6 cents per pound, and are now sold for five cents, live weight; 5½ cents has been paid here, this fall, earlier. These lots have been confined closely or entirely to the foods named and weighed. A little bone was occasionally added, and this is the first time for four years that I have not had pigs cripple in the hind legs. They do not have large pens.

WHEAT TRIALS.

MISSOURI AGRICULTURAL COLLEGE, 1882.

The following is the report of the field trials with the different varieties of wheat on the college farm in 1882:

S. S. LAWS, *President Mo. Agricultural College*—SIR: During 1881–2 twelve varieties of wheat were grown on the College farm. The land selected for testing the comparative merits of the different sorts was a portion of the white-oak ridge east of the farm house, where the soil was of a very even character, and lying in such a position that each variety of wheat was sown upon the top of the ridge and also upon land sloping to the north and to the south. The land was subsoiled in 1877, and in 1878 received about ten wagon-loads per acre of stable manure; since that time it had been in wheat constantly, this being the fourth successive crop without manure.

In August, 1881, the land was plowed and afterward rolled and harrowed to put the soil in as fine condition as possible. The land was laid out in plots containing one-fourth of an acre each, one variety being sown on each on September 20th, at the rate of one and one-half bushels per acre. During the winter the field, containing twenty-six acres, was closely pastured, forty forty hogs being kept upon it until April 1st.

Some of the results of the trial are shown in the following table:

VARIETY.	Date of ripe'ing	Weight per bu.	Bu. per acre.	Lbs. straw per bu.	Color of grain.	Smooth or beard	Length straw.
Bennett.....	June 26	61 lbs 6 oz	30.9	179	Red	bearded	5 feet.
Clawson.....	" 25	62 lbs	31.1	124	White	smooth	4¾ "
Fultz.....	" 21	64 lbs 8 oz	40.	87	Red	"	4¼ "
Fultz.....	" 21	64 lbs 8 oz	39.	86	"	"	4½ "
German Amber...	" 24	63 lbs 4 oz	35.8	103	"	"	4 feet.
Gold Medal.....	" 26	59 lbs 12 oz	32.6	187	White	"	4½ "
Ostery.....	" 19	65 lbs	31.9	97	"	"	4¼ "
Rice.....	" 21	64 lbs 8 oz	33.9	133	Amber	"	4¾ "
Shumaker.....	" 23	64 lbs 10 oz	30.5	123	Red	"	4¾ "
Silver Chaff.....	" 25	60 lbs 6 oz	30.7	145	White	"	4¾ "
Spark's Swamp...	" 23	64 lbs 4 oz	33.5	135	Red	bearded	4¼ "
Washington Glass.	" 25	57 lbs 8 oz	33.5	154	White	smooth	4½ "
White Rogers.....	" 23	61 lbs 6 oz	32.4	130	"	bearded	4¼ "
Average.....		62 lbs 9 oz	33.5	129.5			

From the table above it will be seen that the best yields were from the Fultz, two plots of which were sown, one near each extremity of the trial ground. Of the newer varieties the Ostery seems most promising; although its yield in this trial was less than the average. The seed was received from Russia in 1877, and its average yield since then has been thirty-two and one fourth bushels per acre, and its average weight sixty-two pounds two ounces per bushel, heavier than any other white wheat we have grown. Its extreme hardiness, the stiffness of its straw, and its early ripening, are strong points in its favor.

The Spark's Swamp, received last year from the U. S. Department of Agriculture, seems to be identical with the old Mediterranean.

Washington Glass ripens too late to be of value here. Bennett makes too heavy a growth of straw in as rainy a season as last, but may do better in drier summers.

As a general farm crop fifty-five acres of wheat was grown, mostly of the Fultz variety, giving an average yield of twenty-five bushels per acre. Small amounts of Dallas and Wysor wheat were sown, but with unsatisfactory results, both varieties ripening too late for our climate.

The entire crop has been sold, a large portion of it for seed, the remainder being shipped to Chicago, where it was graded No. 1.

Respectfully submitted,

R. B. MADDEX, Sup't. Farm.

COLUMBIA, Mo., August 15, 1882.

TABLE I.

Prepared from Wolf, Krup and others, by E. E. Adams, B. S., showing the average amount of water, nitrogen and organic matter, the total ash and ash ingredients in one hundred parts of the substance named, in an air dried condition.

Substance.	Water	Ash	Organic matter	Ash Ingredients. Potash	Phos. acid	Magnesia	Lime	Sulphuric acid.	Albuminoids	Carbo-hydrates.	Crude fibre	Fats, etc.	Nitrogen of org. mat'r
Hay.													
Meadow hay	14.3	6.2	79.5	1.7	0.4	0.3	0.7	0.3	8.2	41.3	30.0	2.0	1.3
Red clover	16.7	6.2	77.1	1.9	0.56	0.6	1.9	0.1	13.4	29.9	35.8	3.2	2.1
White clover	16.7	8.5	74.8	1.06	0.8	0.6	1.9	0.5	14.9	34.3	23·6	3.5	2.3
Swedish clover	16.7	8.3	75.0	1.5	0·4	0.7	1.4	0.1	15.3	29.2	30.5	3.3	2.4
Lucerne	16.7	6.4	76.9	1.5	0.5	0.3	2.8	0.3	14.4	22.5	40.0	2.5	2.3
Timothy	14.3	4.5	81.2	0.6	9.2	0.08	0.2	0.08	9.7	48.8	22.7	3.0	0.54
Straw.													
Wheat	14.3	5.5	80.2	0.4	0.2	0.1	0.2	0.1	2.0	30.2	48.0	1.5	0.32
Rye	14.3	3.2	82.5	0.7	0.1	0.1	0.3	0.08	1.5	27.0	54.0	1.3	1.7
Spelt (German wheat)	14.3	6.0	79.7	0.5	0.3	0.04	0.2	0.09	2.0	27.7	50.5	1.4	....
Oat	14.3	5.0	80.7	0.9	0.1	0.1	0.3	1.	2.5	38.2	40.0	2.0	0.4
Pea	14.3	4.0	81.7	1.07	0.3	0.3	1.8	2.	6.5	35.2	40.0	2.0	1.0
Bean	17.3	5.0	77.7	2.5	0.4	0.4	1.3	0.01	10.2	33.5	34.0	1.0	1.6
Corn stalks	14.0	4.0	82.0	1.6	0.3	0.2	0.5	0.2	3.0	39.0	40.0	1.1	0,4
Chaff, etc.													
Wheat	14.3	12.0	73.7	0.8	0.4	0.1	0.1	....	4.5	33.2	36.0	1.4	0.72
Barley	14.3	13.0	72.7	0.9	0.2	0.1	1.27	0.3	3.0	38 7	30.0	1.5	0.48
Oat	14.3	18.0	67.7	1.04	0.02	0.2	0.7	0.2	4.0	29.7	34.0	1.5	0.64
Corn cobs	10.3	2.8	83.2	0.2	0.02	0.02	0.02	0.01	1.4	44.0	37.8	1.4	0.22
Green Fodder.													
Young grass	75.0	2.1	22.9	1.1	0.2	0.06	0.2	0.08	3.0	12.9	7.0	0.8	0.48
English rye-grass	14.3	6.5	79.2	0.5	0.1	0.05	0.1	0.08	10.2	38.9	30.2	2.7	1.63
Peas in blossom	81.5	1.5	17.0	0.5	0.1	0.1	0.3	0.05	3.2	8.2	5.6	0.6	.5
Rye fodder	72.9	1.6	25.5	0.6	0.2	0.05	0.1	0.02	3.3	14.9	7.3	0.9	0.5
Oat fodder	81.0	1.4	17.6	0.6	0.1	0.05	0.1	0.05	2.3	8.8	6.5	0.5	0.4
Fodder corn	82.1	1.2	16.7	0.2	0.07	0.1	0.1	0.03	1.2	10.3	4.7	0.5	0.2
Cabbage heads	89.2	1.1	9.8	0.6	0.2	0.04	0.1	0.1	1.5	6.3	2.0	0.4	0.2
Cabbage stumps	82.0	1.9	16.1	0.5	0.2	0.05	0.1	0.09	1.1	12.2	2.8	0.8	0.2
Beet tops	90.5	1.8	6.7	0.4	0.08	0.1	0.1	0.1	1.9	4.6	1.3	0.5	0.3
Carrot tops	82.2	3.6	14.2	0.3	0.1	0.1	0.8	0.2	3.2	8.0	3.0	1.0	0.5

TABLE I—CONTINUED.

SUBSTANCE.	Water.....	Ash.....	Organic matter.....	ASH INGREDIENTS.					Albuminoids.....	Carbo-hydrates.....	Crude fibre.....	Fats, etc.....	Nitrogenous matter.
				Potash.....	Phos. acid.....	Magnesia.....	Lime.....	Sulphuric acid.					
Roots and Tubers.													
Potatoes	95.0	0.9	24.1	0.5	0.1	0.04	0.02	0.06	2.0	21.0	1.1	0.3	0.3
Field beets	88.0	0.9	11.1	0.4	0.8	0.04	0.04	0.03	1.1	9.1	0.9	0.1	0.2
Sugar beets	81.5	0.8	17.7	0.4	0.1	0.07	0.05	0.04	1.0	15.4	1.3	0.1	0.1
Carrots	85.0	1.0	14.0	0.3	0.1	0.05	0.09	0.06	1.2	10.8	1.7	0.2	0.2
Turnips	91.5	0.8	7.7	0.3	0.1	0.03	0.08	0.1	0.8	5.9	1.0	0.1	0.1
Grains and Seeds.													
Rice	14.6	0.5	84.9	1.27	3.26	0.5	0.3	0.04	7.5	76.5	0.9	0.5	1.2
Wheat	14.4	2.0	83.6	0.5	0.8	0.2	0.06	0.04	13.0	67.7	3.0	1.5	2.0
Rye	14.3	2.0	83.7	0.5	0.8	0.1	0.05	0.04	11.0	69.2	3.5	2.0	1.7
Barley	14.3	2.3	83.4	0.4	0.7	0.1	0.05	0.05	9.0	65.9	8.5	2.5	1.2
Oats	14.3	3.0	82.7	0.4	0.5	0.1	0.1	0.04	12.0	60.9	10.3	6.0	1.5
Corn	14.4	2.1	83.5	0.3	0.5	0.1	0.03	0.01	10.0	68.0	5.5	7.0	1.6
Buckwheat	14.0	2.4	83.6	0.4	0.4	0.1	0.03	0.8	9.0	59.6	15.0	2.5	1.4
Peas	14.3	2.5	83.2	0.9	0.8	0.1	0.1	0.1	0.8	22.5	9.2	2.5	3.5
Beans	14.5	3.5	82.0	1.2	1.1	0.2	0.1	0.1	25.5	45.5	11.5	2.0	4.0
Refuse.													
Sugar beet cake	70.0	3.4	26.6	0.3	0.1	0.05	0.2	0.04	1.8	18.3	6.3	0.2	0.3
Potato slump	94.8	0.6	4.6	0.2	0.1	0.05	0.04	0.04	1.0	2.9	0.6	0.1	1.1
Rye slump	89.7	0.6	9.7	....	....	....	....	....	2.0	5.7	1.5	0.5	0.3
Corn slump	90.6	0.5	8.9	....	....	....	....	....	1.9	5.0	1.0	1.0	0.3
Brewers' grains	76.6	1.2	22.2	0.05	0.4	0.1	0.1	0.01	4.9	10.6	6.2	0.5	0.5
Malt sprouts	8.0	6.8	85.2	2.08	1.2	0.08	0.09	0.3	23.0	42.2	17.5	2.5	3.5
Wheat bran	13.0	5.4	81.5	1.3	2.8	0.9	0.2	....	14.0	45.9	17.8	3.8	2.2
Rape cake	15.0	7.4	77.6	1.3	2.07	0.6	0.6	0.1	30.3	23.8	13.8	9.5	4.8
Linseed cake	14.5	7.9	80.6	1.2	0.1	0.8	0.4	0.1	28.3	37.3	11.0	10.0	4.5
Cotton-seed cake	10.1	7.7	82.2	2.1	2.9	0.2	0.2	0.07	34.3	27.4	9.6	10.9	5.4

For "Meadow" hay we may substitute English, and have a better idea of what is intended.

Organic matter here signifies the combustible part of a plant.

Hydro-carbons or carbo-hydrates include sugar, starch, pectin,—all, in fact, of the organic matter, except fats and the albumen.

Crude fibre is impure cellulose.

Fats, etc., are the ether extract, and contain, beside, fat, wax, chlorophyl, and in some cases resins.

TABLE II.

Showing the general averages of the analyses of fodder materials, selected from Atwater's table, compiled from Wolff. In reproducing these figures, we repeat results (differing slightly) given in a preceding table. But the repetition serves a good purpose, inasmuch as the organic substances and the digestible portions of them appear in connection, and will save the reader a reference to the former table.

KINDS OF FOOD. 100 pounds contain:	The organic substance contains:							Of the organic substance is digestible.			Ratio of digestible albuminoids to digestible carbo-hydrates.*
	Water.....	Ash.....	Organic substance..	Albuminoids.....	Crude fibre.....	Other carbo-hydrates	Fats.....	Albuminoids.....	Carbo-hydrates.....	Fats.....	
Hay.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
Meadow† hay, poor quality	14.3	5.0	80.7	7.5	33.5	38.2	1.5	3.4	34.9	0.5	1: 10.6
" " better quality.	14.3	5.4	80.3	9.2	29.2	39.7	2.0	4.6	36.4	0.6	1: 8.2
" " average qual.	14.3	6.2	79.5	9.7	26.3	41.6	2.3	5·4	41.1	0.9	1: 7.9
" " very good qual	15.0	7.0	78.0	11.7	21.9	42.3	2.2	7.4	42.1	1.0	1: 6.0
" " best quality...	16.0	7.7	76.3	13.5	19.3	40.8	2.6	9.2	43.1	1.2	1: 5.0
Red clover, poor quality....	15.0	5.1	79.9	11.1	28.9	37.7	2.1	5.7	37.9	1.0	1: 7.1
" average quality...	16.0	5.3	78.7	12.3	26.0	38.2	2.2	7.0	38.1	1.2	1: 5.9
" very good quality.	16.5	6.0	77.5	13.5	24.0	37.1	2.9	8.5	38.2	1.7	1: 5.0
White clover.....	16.5	6.0	77.5	14.5	25.6	33.9	3.5	8.1	35.9	2.0	1: 5.0
Swedish or Alsike clover....	16.0	6.0	78.0	15.0	27.0	32.7	3.3	8.6	34.8	1.8	1: 4.6
Lucerne (alfalfa).....	16.0	6.2	77.8	14.4	33.0	27.9	2.5	9.4	28.3	1.0	1: 3.3
Italian rye-grass.....	14.3	7.8	77.9	11.2	22.9	40.6	3.2	7.1	41.5	1.4	1: 6.3
Timothy.....	14.3	4.5	81.2	9.7	22.7	45.8	3.0	5.8	43.4	1.4	1: 8.1
Straw.											
Winter wheat.....	14.3	4.6	81.1	3.0	44.0	32.6	1.5	0.8	31.9	0.4	1: 41.1
Winter rye.....	14.3	4.1	81.6	2.5	48.0	29.8	1.3	0.7	32.8	0.4	1: 48.3
Barley.....	14.3	4.1	81.6	4.0	40.0	36.2	1.4	1.4	36.9	0.4	1: 27.1
Oat.....	14.3	4.0	81.7	3.5	42.0	34.2	2.0	1.3	37.4	0.6	1: 29 9
Pea.....	16.0	4.5	79.5	6.5	38.0	34.0	1.0	2.9	33.4	0.5	1: 12 0
Bean.....	16.0	4.6	79.4	10.2	34.0	34.2	1.0	5.0	35.2	0.5	3: 7.3
Corn stalks.....	15.0	4.2	80.8	3.0	40.0	36.7	1.1	1.1	37.0	0.3	1: 34.4

* The fats are richer in carbon than the carbo-hydrates. In calculating this ratio, 1 lb. of the former is considered as equal to 2½ lbs. of the latter.

† By "meadow hay," we may understand that our "English hay" is meant.

TABLE II—CONTINUED.

KINDS OF GRAIN. 100 pounds contain:	The organic substance contains:							Of the organic substance is digestible.			Ratio of digestible albuminoids to digestible carbo-hydrates
	Water	Ash	Organic substances	Albuminoids	Crude fibre	Other carbo-hydrates	Fats	Albuminoids	Carbo-hydrates	Fats	
Chaff and Cobs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
Wheat	14.3	9.2	73.7	4.5	36.0	35.6	1.4	1.4	32.8	0.4	1: 24.1
Rye	14.3	7.5	78.2	3.6	43.5	29.9	1.2	1.1	34.9	0.4	1: 32.6
Barley	14.3	13.0	72.7	3,0	30.0	38.2	1.5	1.2	35.0	0.6	1: 30.4
Oat	14.3	10.0	75.7	4.0	34.0	36.2	1.5	1.6	36.6	0.6	1: 23.8
Corn cobs	14.0	2.8	83.2	1.4	37.8	42.6	1.4	0.6	41.7	0.4	1: 71.2
Green Fodder.											
Grass just before blossom	75.0	2.1	22.9	3.0	6.0	13.1	0.8	2.0	13.0	0.4	1: 7.6
Pasture grass	80.0	2.0	18.0	3.5	4.5	9.2	0.8	2.4	9.9	0.4	1: 4.5
English rye-grass	70.0	2.0	28.0	3.6	10.6	12.8	1.0	1.8	12.2	0.3	1: 7.2
Timothy	70.0	2.2	27.8	3.4	8.0	16.3	1.1	2.1	16.0	0.5	1: 8.2
Red clover just before blossom	83.0	1.5	15.5	3.3	4.5	7.0	0.7	2.3	7.4	0.5	1: 3.5
Red clover in full blossom	78.0	1.7	20.3	3.2	6.8	9.5	0.8	1.8	9.6	0.5	1: 6.0
White clover	80.5	2.0	17.5	3.5	6.0	7.2	0.8	2.2	7.9	0.5	1: 4.2
Swedish clover	85.0	1.5	13.5	3.3	4.5	5.1	0.6	2.1	5.8	0.4	1: 3.2
Lucerne in blossom	74.0	2.0	24.0	4.5	9.5	9.2	0.8	3.2	9.1	0.3	1: 3.1
Peas in blossom	81.5	1.5	17.0	3.2	5.6	7.6	0.6	2.2	7.4	0.3	1: 3.7
Green rye fodder	76.0	1.6	22.4	3.3	7.9	10.4	0.8	1.9	11.0	0.4	1: 6.3
Green oat fodder	81.0	1.4	17.6	2.3	6.5	8.3	0.5	1.3	8.9	0.2	1: 7.2
Fodder corn	82.2	1.1	16.7	1.2	4.7	10.3	0.5	0.8	9.9	0.2	1: 13.0
Cabbage (?)	89.0	1.2	9.8	1.5	2.0	5.9	0.4	1.1	6.0	0.2	1: 5.8
Cabbage stumps	82.0	1.9	16.1	1.1	2.8	11.9	0.3	0.8	11.5	0.2	1: 15.0
Field beet leaves	90.5	1.8	7.7	1.9	1.3	4.0	0.5	1.2	4.0	0.2	1: 3.7
Carrot leaves	82.2	3.6	14.2	3.2	3.0	7.1	1.0	2.2	7.6	0.5	1: 3.8
Roots and Tubers.											
Potatoes	75.0	0.9	24.1	2 1	1.1	20.6	0.3	2.1	20.6	0.3	1: 10.2
Kohl-rabi	87.0	1.0	12.0	1.3	1.1	9.5	0.1	1.3	9.5	0.1	1: 7.5
Field beets	88.0	0.8	11.2	1.1	0.9	9.1	0.1	1.1	9.1	0.1	1: 8.5
Sugar beets	81.5	0.7	17.8	1.0	1.3	15.4	0.1	1.0	15.4	0.1	1: 15.7
Carrots	85.0	0.9	14.1	1.4	1.7	10.8	0.2	1.4	10.8	0.2	1: 8.1
Turnips	92.0	0.7	7.3	1.1	0.8	5.3	0.1	1.1	5.3	0.1	1: 5.1

TABLE II—CONTINUED.

KINDS OF FOOD. 100 pounds contain.	The organic substance contains:							Of the organic substance is digestible:			Ratio of digestible albumoins to digestible carbo-hydrates*.....
	Water.....	Ash.....	Organic substance...	Albuminoids.....	Crude fibre.....	Other carbo-hydrates.	Fats.....	Albuminoids.....	Carbo-hydrates.....	Fats.....	
Grains and Seeds.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
Rice	14.0	0.3	85.7	7.7	2.2	75.4	0.4	6.9	71.6	0.3	1: 10.5
Wheat	14.4	1.7	83.9	13.0	3.0	66.4	1.5	11.7	63.1	1.2	1: 5.6
Rye	14.3	1.8	83.9	11.0	3.5	67.4	2.0	9.9	64.0	1.6	1: 6.9
Barley	14.3	2·2	83.5	10.0	7.1	63.9	2.5	8.0	57.5	1.7	1: 7.7
Oats	14.3	2.7	83.0	12.0	9.3	55.7	6.0	9.0	41.8	4.7	1: 6.0
Maize	14.4	1.5	84.1	10.0	5.5	62.1	6.5	8.4	57,8	4.8	1: 8.3
Buchwheat	14.0	1.8	84.2	9.0	15.0	58.7	1.5	6.8	44.0	1.2	1: 6.9
Peas	14.3	2.4	83.3	22.4	6.4	52.5	2.0	20.2	49.9	1.7	1: 2.7
Beans	14.5	3.1	82.4	25.5	9.4	45.9	1.6	23.0	43.6	1.4	1: 2.1
Flax seed	12.3	3.4	84.3	20.5	7.2	19.6	37.0	17.2	15.3	35.2	
Rape seed	11.8	3.9	84.3	19.4	10.3	12.1	42.5	15.5	9.3	40.4	
Cotton seed	7.7	7.8	84.5	22.8	16.0	15.4	30.3	17.1	11.6	27.3	
Refuse.											
Sugar beet cake	70.0	3.4	26.6	1.8	6.3	18.3	0.2	1.8	18.3	0.2	1: 10:4
Potato slump	94.8	0.6	4.6	1.0	0.6	2.9	0.1	1.0	2.9	0.1	1: 3.1
Rye slump	89.7	0.6	9.7	2.0	1.5	5.7	0.5	1.8	5.4	0.4	1: 3.6
Maize slump	90.6	0.5	8.9	1.9	1.0	5.0	1.0	1.7	4.8	0.8	1, 4.0
Brewers' grains	76.6	1.2	22.2	4.9	6.2	10.6	0.5	3·9	9.5	0.4	1: 2.7
Malt sprouts	8.0	6.8	85.2	23.0	17.5	42.2	2.5	18.4	38.0	1.7	1: 2.3
Wheat bran	13.1	5.4	81.5	14.0	17.8	15.9	3.8	10.9	27.6	3.4	1: 4.2
Rape cake	15.0	7.4	77.6	30.3	13.8	23.8	9.5	24.1	18.3	7.7	1: 1.6
Linseed cake	11.5	7.9	80.6	28.3	11.	37.3	10.	23.6	29.0	8.9	1: 2.2
Cotton seed cake	10.1	7.7	82.2	34.3	9.6	27.4	10.9	28.8	17.	9.9	1: 1,5
*Shorts or bran	11.6	4.3	84.1	12,0	8.3	39 6	4.2	8.4	48.9	3.7	1: 6.9
* Middlings	12.7	2.1	85.2	10.6	4.5	67.0	3.1	81.1	61.3	2.4	1: 7.8

*Calculated from analyses by Prof. Storer.

The preceding analyses are of foreign origin. Analyses of American products are yet incomplete, and for some of our farm crops nearly or often quite entirely wanting. The only compilation of American analyses extant was made in 1879 by Dr. E. H. Jenkins, for the Connecticut Experiment Station, under direction of Prof. Johnson, its director.

Many analyses have since been added, but are not accessible to me within the time at command.

ANALYSES OF NORTH AMERICAN FODDER AND FEEDING STUFFS.

(See page 9.)

COMPILED BY DR. E. H. JENKINS.

In the following list are given references to such published analyses as have not been included in these tables. Some are partial analyses, several proximate elements being left undetermined; others were made on specially selected samples, e. g., on particularly large or small seed, and others were made by methods which prevent comparison with other analyses:

Apple.—Trans. N. Y. Ag'l Soc., 1849, p. 737.
Artichoke.—Trans. N. Y. Ag'l Soc., 1850, p. 339.
Beet.—Trans. N. Y. Ag'l Soc., 1852, p. 323.
Beans.—U. S. Dept. Ag., 1878, p. 124.
Buckwheat.—U. S. Pat. Off. Rep., 1849. p. 470.
Carrot.—Trans. N. Y. Ag'l Soc., 1852, p. 323.
Celery.—Trans. N. Y. Ag'l Soc., 1852, p. 323.
Chicory.—Ohio Ag'l Rep., 1862, p. 254.
Cucumber.—Trans. N. Y. Ag'l Soc., 1852, p. 323.
Endive.—Trans. N. Y. Ag'l Soc., 1852, p. 323.
Maize.—Trans. N. Y. Ag'l Soc., 1848, p. 678.
U. S. Pat. off. Rep., 1849, p. 470.
U. S. Pat. Off. Rep., 1857, p. 160.
U. S. Pat. Off. Rep., 1873, p. 180.
U. S. Pat. Off. Rep., 1875, p. 144.
Muskmelon.—Trans. N. Y. Ag'l Soc., 1852, p. 323.
Parsnip.—Trans. N. Y. Ag'l Soc., 1850, p. 339.
Peanut.—U. S. Dept. Ag., 1870, p. 92.

Peas.—U. S. Dept. Ag., 1878, p. 124.

Rhubarb.—Trans. N. Y. Ag'l Soc., 1849, p. 737.

Vegetable Oyster (salsify).—Trans. N. Y. Ag'l Soc., 1852, p. 323.

"Tuckahoe" U. S. Dept. Ag. 1871, p. 98.

Watermelon.—Trans. N. Y. Ag'l Soc., 1852, p. 323.

Wheat.—Ohio Ag'l Rep., 1857, p. 727.

U. S. Pat. Off. Rep., 1840, p. 64.

Yam (Chinese).—U. S. Pat. Off. Rep., 1857, p. 165.

In a considerable number of cases analysis have determined sugar, gum, dextrin, wax, etc.

Such analyses have been recalculated, the wax reckoned as fat and the other ingredients collectively as N. fr. (nitrogen-free.) Extract. These analyses are indicated as follows:—

† That sugar, gum, albuminoids soluble in alcohol—sometimes called "Zein"—and albuminoids insoluble in alcohol were determined.

* That wax, sugar, gum and dextrin, "amylaceous cellulose" and "alkali extract" were determined.

‡ That sugar and gum were determined.

Albuminoids in all cases signify the percentage of nitrogen multiplied by 6.25.

I. GRAIN AND

No.	Variety.	Reference.
	Maize (Flint Corn).	
1	Norfolk White, large, 16 rowed, N. C.	Rep. Ct. Ag'l Ex. St. '77, p. 57
2	Vermont White Cap, 1877, Ct.	" " "
3	Rowley, 1877, Ct.	" " "
4	Western Yellow, ground exclusively for feed. Raised at the West.	Rep. Mid. Ag. Ex. St. '77-p. 29
5	Southern White.	" " "
6	Yellow or Canada, 8 rowed, Conn., 5 bushels shelled corn to the acre.	" " "
7	Early Dutton, 12 rowed, kernels rather small.	Am. Jour. Sc. & Arts, '69, p. 352
8	Common Yellow or Canada, 8 rowed, kernels good size.	" " "
9	King Philip or Rhode Island. Brown red, 8 rowed, kernals large.	" " "
10	Smut nose. Mich.	Rep. Mich. Bd. Ag. '78, p. 409
11	" "	" " "
12	8 Rowed Flint. Mich.	" " "
13	Sanford. Mich.	" " "
14	Compton's Early. Penn.	Rep. U. S. Dept. Ag. '78, p. 149
15	Adams. New Hampshire.	" " "
16	Canada. "	" " "
17	Vermont. Vermont.	" " "
18	Small 12 rowed. N. Hampshire.	" " "
19	State Fair Premium. "	" " "
20	Large Premium. "	" " "
21	Board of Agriculture. "	" " "
22	King Philip. "	" " "
23	Pop Corn, white.	" " "
24	Improved Prolific. Tennessee.	" " 148...
25	White Mexican. Mexico.	" " "
26	Oregon White. Oregon.	" " "
27	Small, 8 rowed. N. Hampshire.	" " "
28	Miscegenation (white and blue). N. Hampshire.	" " "
29	Pitch Knot. N. Hampshire.	" " "
30	Tom Thumb, Yellow. N. Hampshire.	" " "
31	Old Fashioned Yellow, 1878. Conn.	Rep. Ct. Ag. Ex. St., '79, p. 88
	Average Composition (31 Analyses).	....
	Maximum	....
	Minimum	....
	Maize (Dent Corn).	
32	Ohio Dent, 1877. Conn.	Rep. Ct. Ag. Ex. St., '77, p. 57
33	Yellow Dent, 1877. Mich.	Rep. Mich. Bd. Ag., '78, p. 408
34	" " "	" " "
35	White Dent, 1877. Mich.	" " "
36	Hackberry Dent, 1877. Mich.	" " "
37	Strawberry Roan, 1877. Mich.	" " 409...
38	White Oil. Indiana.	" " "
39	Pony Dent. Mich.	" " "
40	" [illegible] "	" " "

OTHER SEEDS.

Analyst.	No.	Water	Ash	Albuminoids.	Fibre	N. fr. extract	Fat	Water-free.				
								Ash	Albuminoids....	Fibre.. ..	N. fr. extract...	Fat.
S. W. Johnson...	1	11.17	1.31	10.88	1.90	70.04	4.70	1.48	12.25	2.14	78.84	5.29
" ...	2	10,86	1.53	11.06	1.04	71.22	4.29	1.72	12.41	1.17	79.88	4.81
" ...	3	11.00	1.61	11·63	.78	70.15	4.83	1.81	13.06	.88	78.83	5.42
W. O. Atwater...	4	13.93	1.25	8.82	1.59	70.48	3.92	1.45	10.25	1.85	81.89	4.56
" ...	5	13.82	1.32	8.80	0.88	71.07	4.02	1.53	10.31	1.02	92.47	4.67
" ...	6	15.10	1.36	10.01	1.24	66.99	5.31	1.60	11.56	1.69	78.90	6.25
" ...	†7	8.08	1.52	9.62	2.52	72.62	5.64	1.66	10.46	2.74	78.98	6.16
" ...	†8	10.52	1.31	9.72	2.40	71.63	4.42	1.46	10.86	2.68	80.06	4.94
" ...	†9	9.79	1.60	11.87	2.21	70.08	4.45	1.77	13.16	2.45	77.69	4.93
R. C. Kedzie....	†10	12.00	1.54	11.81	2.00	66.81	4.94	1.76	13.55	2.29	76.63	5.67
" ...	†11	13.26	1.49	11.51	2.49	66.11	5.14	4.72	13.27	2.87	76.21	5.93
" ...	†12	13.45	1.43	12.00	2.26	66.03	4.83	1.65	13.86	2.61	76.30	5.58
" ...	†13	13.37	1.37	10.69	2.10	67.41	5.06	1.58	12.34	2.42	77.82	5.84
Peter Collier.....	†14	6.59	1.64	9.90	2.09	74.48	5.30	1.76	10.59	2.24	79.74	5.67
" ...	†15	8.61	1.57	10.50	1.19	73.30	4.83	1.72	11.48	1.30	80.22	5.28
" ...	†16	8.27	1.72	11.36	1.26	71.79	5.60	1.87	12.36	1.37	78.29	6.11
" ...	†17	8.64	1.45	10.14	1.38	72.76	5.63	1.59	11.10	1.51	79.63	6.17
" ...	†18	11.48	1.34	10.50	1.09	69.56	6.03	1.51	11.87	1.23	78.58	6·81
" ...	†19	10.19	1.78	10.82	1.06	70.86	5.29	1.98	12.05	1.18	78.90	5.89
" ...	†20	10.00	1.46	11.36	1.09	70.57	5.52	1.62	12.63	1.21	78.40	6.14
" ...	†21	11.09	1.31	11.55	.82	70.55	4.68	1.47	12.99	.90	79.38	5.26
" ...	†22	10.23	1.84	12.08	1.01	67.79	7.05	2.04	13.47	1.13	75.50	7.86
" ...	†23	8.61	1.63	13.13	2.32	68.68	5.63	1.78	14.37	2.54	75.15	6.16
" ...	†24	7.58	1.23	9.29	2.65	74.16	5.09	1.33	10.05	2.87	80.24	5.51
" ...	†25	8.65	1.87	10.15	1.64	72.79	4.90	2.04	11.11	1.79	79.70	5.36
" ...	†26	9.25	1.46	7.88	1.26	73.07	7.08	1.61	8.68	1.39	89.52	7.80
" ...	†27	11.05	1.57	13.65	1.30	67.63	4.80	1.76	15.35	1.46	76.03	5.40
" ...	†28	9.92	1.63	11.72	1.05	70.35	5.33	1.81	13.01	1.17	78.09	5.92
" ...	†29	11.24	1.52	11.20	1.04	69·74	5.26	1.71	12.62	1.17	78.58	5.92
" ...	†30	9.05	1.60	12.60	1·33	69.53	5.89	1.76	13.85	1.46	76.46	6.47
S. W. Johnson...	31	10.58	1.43	9.81	1.39	72.11	4.68	1.60	10.99	1.55	80.63	5.23
.....	....	10·58	1.50	10.70	1.56	70.19	5.16	1.67	12.13	1.71	78.72	5.77
.....	....	15.10	1.87	13.65	2.67	74.48	7.08					
.....	....	6.59	1.25	7.88	.78	66.11	3.92					
S. W. Johnson...	32	10.78	1.37	10.06	1.35	71.30	5.14	1.54	11.27	1.51	79.92	5.76
R. C. Kedzie.....	†33	12.74	1.41	11.75	2.49	66.98	4.63	1.62	13.47	2.85	76.75	5.31
" ...	†34	11.66	1.51	11.48	2.48	67.80	5.07	1.71	12.99	2.81	76.75	5.74
" ...	†35	13.73	1.60	11.52	2.26	66.26	4.63	1.85	13.35	2.62	76.81	5.37
" ...	†36	12.47	1.47	9.88	2.30	69.11	4.77	1.68	11.29	2.74	78.84	5.45
" ...	†37	14.05	1.39	10.31	2.03	67.63	4.59	1.62	12.00	2.36	78.68	5.34
" ...	†38	11.29	1.28	10.50	1.90	70.16	4.87	1.44	11.83	2.14	79.10	5.49
" ...	†39	13.42	1.40	11.25	2.16	66.94	4 83	1.62	12.99	2.49	77.32	5.58
" ...	†40	13.29	1.31	10.63	2.21	67.53	5.03	1.51	12.26	2.55	77.88	5.80

I. GRAIN AND OTHER

No.	Reference and remarks.	Reference.
	Maize (Dent Corn).—Continued.	
41	White Dent, N. Carolina	Rep. U. S. Dept. Ag., '78, p. 148
42	Mexican White Dent, Mexico	" " "
43	White Prolific, Penn	" " "
44	Coe's Prolific, 1878, Conn	Rep. Ct. Ag. Ex. '79, p. 88...
45	Benton, 1878, Conn	" " "
46	Scioto, 1878, Conn	Rep. Ct. Ag. Ex. St., '79, p. 88.
47	White Ohio, 1878, Conn	" " "
48	Wisconsin, 1878, Conn	" " "
49	White Prolific, 1878, Conn	" " "
50	Extra Early Adams, 1878, Conn	" " "
	Average (19 analyses)	
	Maximum	
	Minimum	
	Maize (Sweet Corn).	
51	Immature Sweet, Conn., harvested Aug. 9, '77	Rep. Ct. Ag. Ex. St., '78, p. 67.
52	Immature Sweet, harvested Aug. 25, 1876	" " "
53	Full grown Sweet, harvested Sept. 25, 1877	" " "
54	Stowell's Evergreen Sweet, 12 and 16 rowed. Ears short and thick, Conn	Am. Jour. Sci. & Arts, '69, p. 352.
55	Stowell's Evergreen, New England	Rep. U. S. Dept. Ag. '78, p. 148
56	Egyptian, Maryland	" " "
57	Red River, Minnesota	" " "
58	Golden Sugar, Mass	" " "
59	Marblehead Mammoth, Mass	" " "
60	Prolific	" " "
61	Proctors, Mass	" " "
62	Mexican Blue, Mexico	" " "
63	Mammoth Sweet, 1878, Conn	Rep. Ct. Ag. Ex. St., '79, p. 88
	Average (11 analyses)*	
	Maximum	
	Minimum	
	Maize (unclassified).	
64	Tuscarora, 1877, Conn	Rep. Ct. Ag. Ex. St., '77, p. 57
65	Tuscarora, 1877, Mich	Rep Mich. Bd. Ag. '78, p. 409
	Average of all varieties (63 analyses)	
	Maximum	
	Minimum	
	Winter Wheat.	
†1	Michigan White Winter. Milling extra.. Detroit inspection. Cleaned for grinding	Rep. Mid. Ag. Ex. St., '77-8, p. 25
2	Missouri Red Fall. St. Louis inspection. Cleaned for grinding	" " "

SEEDS—CONTINUED.

Analyst.	No.	Water	Ash	Albuminoids.	Fibre.....	N. fr. extract	Fat.	Water-free. Ash	Albumin-oids....	Fibre....	N. fr. ex-tract...	Fat.
P. Collier....	†41	6.74	1.43	11.03	1.53	74.09	5.18	1.53	11.82	1.63	79.47	5.55
"	†42	11.14	1.45	10.67	1.59	68.87	6.28	1.64	11.99	1.79	77.51	7.07
"	†43	8.96	1.43	8.05	1.25	74.49	5.82	1.57	8.84	1.37	81.82	6.40
S. W. Johnson...	44	9.55	1.45	10.13	2.19	72.70	3.98	1.60	11.21	2.42	80.36	4.41
" ...	45	10.70	1.57	9.97	1.36	71.40	5.00	1.76	11.18	1.52	79.94	5.60
" ...	46	10.43	1.53	9.25	1.80	72.98	4.01	1.71	10.31	2.01	81.49	4.48
" ...	47	9.70	1.79	11.28	1.73	71.30	4.20	1.88	12.50	1.92	78.95	4.65
" ...	48	9.72	1.56	11.60	2.06	70.17	4.89	1.73	12.85	2.28	77.72	5.42
" ...	49	10.14	1.67	9.19	1.34	73.38	4.28	1.86	10.23	1.49	81.66	4.76
" ...	50	10.94	1.75	10.81	1.48	70.21	4.81	1.97	12.14	1.66	78.83	5.40
.....	....	11.13	1.48	10.49	1.86	70.20	4.84	1.67	11.81	2.10	78.96	5.46
.....	....	14.05	1.79	11.75	2.49	74.49	6.28					
.....	....	6.74	1.28	8.05	1.25	66.26	3.98					
S. W. Johnson...	(51)	10.12	2.19	14.50	2.57	62.70	7.92	2.44	16.14	2.86	69.75	8.81
" ...	(52)	10.09	2.08	15.31	2.52	61.78	8.22	2.31	17.02	2.80	68.73	9.14
" ...	53	9.45	2.06	14.38	1.93	63.05	9.13	2.27	15.88	2.13	69.64	10.08
W. O. Atwater...	†54	10.86	1.89	11.10	2.63	65.86	7.66	2.12	12.45	2.95	73.89	8.59
P. Collier.....	†55	5.98	1.92	11.91	2.66	69.53	8.00	2.04	12.67	2.83	73.95	8.51
"	†56	7.54	1.92	11.55	2.02	69.17	7.80	2.07	12.58	2.19	74.73	8.53
"	†57	9.13	1.89	11.73	1.46	66.48	9.31	2.07	12.92	1.60	73.17	10.24
"	†58	6.27	1.93	14.35	1.58	66.70	9.17	2.06	15.31	1.69	71.16	9.78
"	†59	6.47	1.92	12.78	1.88	67.95	9.00	2.06	13.67	2.01	72.64	9.62
"	†60	10.38	1.87	10.33	2.04	67.73	7.65	2.07	11.49	2.26	75.68	8.50
"	†61	10.13	1.92	12.08	1.75	66.17	7.95	2.14	13.44	1.95	73.63	8.84
"	†62	8.97	1.42	10.21	1.80	72.35	5.25	1.56	11.22	1.98	79.47	5.77
S. W. Johnson...	63	9.43	1.93	12.32	2.75	66.09	7.48	2.13	13.60	3.04	72.97	8.26
.....	....	8.59	1.88	12.08	2.04	67.37	8.04	2.06	13.20	2.24	73.62	8.88
.....	....	10.86	2.06	14.38	2.75	72.35	9.31					
.....	....	5.98	1.42	10.21	1.46	63.05	5.25					
S. W. Johnson...	64	11.25	1.47	11.44	1.28	68.82	5.74	1.66	12.89	1.44	77.54	6.47
R. C. Kedzie.....	†65	14.08	1.52	10.86	1.80	65.97	5.77	1.77	12.64	2.09	76.78	6.72
.....	....	10.47	1.56	10.96	1.73	69.69	5.59	1.74	12·22	2.00	77.80	6.24
.....	....	15.10	2.06	14.38	2.75	74.49	9.31					
....	....	5.98	1.23	7.88	.78	63.05	3.92					
W. O. Atwater...	*1	12.75	1.56	11.64	1.83	70.96	1.26	1.79	13.34	2.10	81.33	1.44
" ...	2	13.52	1.55	11.79	1.72	69.95	1.47	1.79	13.63	1.99	80.89	1.70

*51 and 52 excluded.

I. GRAIN AND OTHER

No.	Variety.	Reference.
	Winter Wheat—Continued.	
3	Diehl, Mich	Rep. Mich., Bd. Ag. '77, p. 350.
4	"	" " " 351.
5	"	" " " 350.
6	"	" " "
7	Soules, Mich	" " "
8	Soules, British Columbia	" " "
9	" "	" " "
10	" "	" " "
11	Lincoln, Mich	" " "
12	" "	" " "
13	Fultz, Mich	" " "
14	" "	" " "
15	Treadwell, Mich	" " "
16	" "	" " "
17	" "	" " "
18	Buckeye or White Wabash	" " "
19	Tappahannock, Mich	" " "
20	Lancaster, Mich	" " "
21	Asiatic, Mich	" " "
22	Gold Medal, Mich	" " "
23	" "	" " "
24	Egyptian Red, Mich	" " "
25	Clawson, Mich	" " "
26	" "	" " "
27	" "	" " "
28	" "	" " "
29	" "	" " "
30	" "	" " "
31	" "	" " "
32	" "	" " "
33	" "	" " "
34	" "	" " "
35	Clawson, Oregon	" " " 351
36	Weeks, Mich	" " " 350
37	Powers, Mich	" " "
38	Armstrong, Mich	" " "
39	Tuscan, Mich	" " "
40	Post, Mich	" " "
41	Sonora Club, Oregon	" " " 351
42	Yellow, Missouri	Rep. U. S. Dept. Ag., '78, p. 147
43	Swamp, Ohio	" " "
44	Victor, Canada	" " "
45	Silver Chaff, Canada	" " "
46	Foizy, Oregon	" " "
47	Brazilian, Oregon	" " "
48	Polish, Maryalnd	" " "
49	White, Oregon	" " "
	Average (49 analyses)	
	Maximum	
	Minnimum	

SEEDS—CONTINUED.

Analyst.	No.	Water	Ash	Albuminoids.	Fibre.....	N. fr. extract	Fat.	Water-free. Ash	Albuminoids...	Fibre....	N. fr. extract..	Fat.
R. C. Kedzie	3	9.64	1.72	12.38	..	76.26	..	1.90	13.69	..	84.41	..
"	4	12.18	1.82	13.78	..	72.22	..	2.07	15.63	..	82.30	..
"	5	12.68	1.77	11.81	..	73 74	..	2.03	13.54	..	84.43	..
"	6	10.25	1.50	11.88	..	76.37	..	1.67	13.24	..	85.09	..
"	7	11.02	1.73	11.81	..	75.44	..	1.94	12.81	..	84.75	..
"	8	8.51	1.63	12.25	..	77.61	..	1.78	13.39	..	84.84	..
"	9	11.22	2.09	11.88	..	74.81	..	2.35	13.34	..	84.29	..
"	10	10.07	1.89	13.45	..	74.59	..	2.10	14.96	..	82.94	..
"	11	13.38	1.56	11.90	..	73.16	..	1.80	13.78	..	84.42	..
"	12	10.78	1.75	11.38	..	76.09	..	1.97	12.76	..	85.27	..
"	13	11.45	1.74	11.59	..	75.22	..	1.98	13.09	..	84.93	..
"	14	12.53	1.74	14.47	..	71.26	..	1.99	16.54	..	81.47	..
"	15	12.69	1.71	12.50	..	73.10	..	1.96	14.31	..	83.73	..
"	16	9.94	1.80	11.69	..	76.57	..	2.02	12.99	..	84.99	..
"	17	10.00	1.76	11.88	..	76.36	..	1.96	13.20	..	84.84	..
"	18	12.73	1.38	10.97	..	74.92	..	1.58	12.69	..	85.73	..
"	19	11.21	1.77	13.56	..	73.46	..	2.00	15.27	..	82.73	..
"	20	11.93	1.82	14.00	..	72.25	..	2.06	15.88	..	82.06	..
"	21	11.11	1.70	12.25	..	74.94	..	1.91	13.78	..	84.31	..
"	22	10.55	1.73	11.15	..	76.57	..	1.93	12.47	..	85.60	..
"	23	10.12	2.00	13.06	..	74.82	..	2.23	14.51	..	83.26	..
"	24	11.48	1.69	11.19	..	75.64	..	1.91	12.64	..	85.45	..
"	25	12.29	1.64	11.88	..	74.19	..	1.87	13.54	..	84.59	..
"	26	11.30	1.74	10.94	..	76.02	..	1.97	12.33	..	85.70	..
"	27	12.99	1.79	11.16	..	74.76	..	2.06	12.72	..	85.22	..
"	28	10.36	1.64	11.81	..	76.19	..	1.83	13.21	..	84.96	..
"	29	11.19	1.76	12.06	..	74.99	..	1.99	13.59	..	84.42	..
"	30	11.09	1.64	12.38	..	74.89	..	1.85	13.93	..	84.22	..
"	31	11.08	1.49	12.25	..	75.18	..	1.68	13.78	..	84.54	..
"	32	10.43	1.70	12.69	..	75.18	..	1.90	14.17	..	83.93	..
"	33	10.31	1.60	12.25	..	75.84	..	1.78	13.66	..	84.56	..
"	34	13.00	1.79	11.37	..	73.84	..	2.05	13.07	..	84.88	..
"	35	12.99	1.77	10.50	..	74.74	..	2.03	12.07	..	85.90	..
"	36	10.03	1.59	11.00	..	77.38	..	1.77	12.22	..	86.01	..
"	37	10.85	1.70	12.03	..	75.42	..	1.91	13.50	..	84.69	..
"	38	12.21	1.97	12.88	..	72.94	..	2.24	14.66	..	83.10	..
"	39	13.77	1.72	11.37	..	73.14	..	1.99	13.19	..	84.82	..
"	40	10.27	1.58	11.25	..	76.90	..	1.78	12.54	..	85.70	..
"	41	10.91	1.46	10.63	..	77.00	..	1.63	11.93	..	86.44	..
P. Collier...	†42	7.69	1.91	11.59	1.53	75.17	2.11	2.07	12.56	1.66	81.42	2.29
"	†43	7,63	1.84	11.59	1.54	74.99	2.41	2.00	12.55	1.67	81.17	2.61
"	†44	7.49	1.39	9.45	1.69	77.71	2.27	1.50	10.22	1.83	84.01	2.44
"	†45	8.93	1.58	9.89	1.75	75.41	2.44	1.73	10.86	1.92	82.81	2.68
"	†46	8.98	1.57	8.40	1.25	77.52	2.28	1.73	9.23	1.37	85.16	2.51
"	†47	9.29	1.77	9.45	1.17	76.33	1.99	1.95	10.42	1.29	84.15	2.19
"	†48	10.08	1.67	12.43	1.56	71.59	2.67	1.86	13.82	1.73	79.62	2.97
"	†49	9.52	1.57	8.58	1.53	77.11	1.69	1.74	9.47	1.68	85.24	1.87
.....	....	10.93	1.70	11.71	.....	75.66	....	1.91	13.13	.....	84.96	
.....	....	13.17	2.09	14.47	.....	81.67						
.....	....	7.49	1.38	8.40	.....	71.26						

I. GRAIN AND OTHER

No.	Variety.	Reference.
	Spring Wheat.	
50	Improved Fife, Canada	Rep. U. S. Dept. Ag., '78, p. 48
51	Champlain, N. Y.	" " "
52	Defiance, N. Y.	" " "
53	Chili Club, Oregon	" " "
54	Noah Island, Oregon	" " "
55	Spring Wheat, Minnesota	Rep. Mich. Bd. Ag. '77, p. 350
	Average (6 analyses)	
	Maximum	
	Minimum	
	Average of all wheats (55 analyses)	
	Oats.	
*1	Probably Illinois "No. 1 White Oats"	Rep. Mid. Ag. Ex. St., '77-8, p. 2
2	Connecticut, 1877, 30 bushels per acre	" " "
	Average (2 analyses)	
	Rye.	
1	White Winter, Penn	Rep. U. S. Dept. Ag., '78, p. 148
	Barley.	
1	Nepaul, Cal	" " "
	Cow Pea—(Dolichos.)	
1	Black Cow Pea. Taken when seeds were ripe.	Rep. N. C. Ag. Ex. St., '79, p. 112
2	Yellow Cow Pea. Taken when seeds were ripe.	" " " 113
	Average (2 analyses)	

SEEDS—CONTINUED.

Analyst.	No.	Water	Ash	Albuminoids.	Fibre.	N. fr. extract	Fat.	Water-free.				
								Ash	Albuminoids...	Fibre ...	N. fr. extract ..	Fat.
P. Collier...	†50	8.50	1.47	14.70	1.62	71.15	2.56	1.61	16.07	1.77	77.75	2.80
"	†51	8.79	2.05	15.40	1.49	69.72	2.55	2.25	16.89	1.63	76.43	2.80
"	†52	8.12	1.57	14.00	2.04	71.78	2.49	1.71	15.23	2.22	78.13	2.71
"	†53	7.90	1.56	8.14	1.41	78.68	2.33	1.69	8.83	1.53	85.42	2.53
"	†54	9.64	2.00	9.80	1.92	74.58	2.06	2.21	10.84	2.12	82.55	2.28
R. C. Kedzie	55	11.13	1.95	14.00	..	72.92	..	2.20	15.75	..	82.05	..
.....	....	9.01	1.76	12.67	..	76.56	..	1.94	13.93	..	84.13	..
.....	....	11.13	2.05	15.40	..	82.42	..					
.....	....	7.90	1.47	8.14	..	72.92	..					
.....	....	10.72	1.70	11.82	..	75.76	..	1.90	13.24	..	84.86	..
W.O.Atwater	1	11.23	2.91	11.54	12.18	57.08	5.06	3.28	13.00	13.72	64.30	5.70
"	2	12.36	3.03	8.00	12.89	59.02	4.70	3.46	9.13	14.71	67.34	5.36
....	....	11.79	2.97	9.77	12.53	58.06	4.88	3.37	11.07	14.22	65.81	5.53
P. Collier...	†1	8.68	1.87	12.07	1.40	73.91	2.07	2.04	13.21	1.54	80.95	2.26
"	‡1	7.23	1.94	13.17	1.55	72.96	3.15	2.09	14.19	1.67	78.65	3.40
A. R. Ledoux	1	20.85	2.94	20.08	4.34	50.51	1.28	3.72	25.37	5.48	63.81	1.62
"	2	19.20	3.31	23.02	5.03	48.07	1.37	4.10	28.50	6.23	59.49	1.68
....	....	20.02	3.13	21.55	4.68	49.29	1.33	3.91	26.93	5.86	61.65	1.65

† These figures differ from those given in *loc. cit.* which have been corrected by the analyst.

II. MILL

No.	Variety.	Reference.
	Maize Meal.	
1	From Feed Store, Conn	Rep. Ct. Ag. Ex. St., '77, p. 56
2	New Home-ground Yellow Flint, Conn	" " "
3	Western Corn, Conn	" " "
	Average (3 analyses)	
	Maximum	
	Minimum	
	Wheat Flour—(From Winter Wheat).	
1	Diehl, Mich	Rep. Mich. Bd. Ag., '77, p. 350
2	"	" " "
3	Soule's, Mich	" " "
4	Fultz, Mich	" " "
5	Treadwell, Mich	" " "
6	Buckeye, Mich	" " "
7	Asiatic, Mich	" " "
8	Gold Medal, Mich	" " "
9	" "	" " "
10	Egyptian Red, Mich	" " "
11	Clawson, Mich	" " "
12	" "	" " "
13	Weeks, Mich	" " "
14	Powers, Mich	" " "
15	Armstrong, Mich	" " "
16	Tuscan, Mich	" " "
	Average (16 analyses)	
	Maximum	
	Minimum	
	Wheat Flour—(From Spring Wheat.)	
17	Tea Wheat Flour, Kansas	Rep. Mich. Bd. Ag., '77, p. 350
18	Grass Wheat, Kansas	" " "
19	Early May, Kansas	" " "
20	Blue Stem, Kansas	" " "
21	Mammoth Spring, Kansas	" " "
	Average (5 analyses)	
	Maximum	
	Minimum	
22	Minnesota Flour, Minnesota	Rep. Mich. Bd. Ag., '77, p. 350
23	" " "	" " "
24	Patent Process Flour, Mich	" " "
*25	"New Process Flour," Conn	Rep. Mid. Ag. Ex. St. '77-8, p. 35
*26	"No. 1 Flour"	" " "
*27	"No. 2 Flour"	" " "
*28	"No. 3 Flour"	" " "

* These figures differ from those given in *loc. cit.*, which have been corrected by the analyst.

'RODUCTS.

Analyst.	No.	Water	Ash	Albuminoids.	Fibre.....	N. fr. Extract	Fat.	Water-free. Ash	Albuminoids.	Fibre....	N. fr. Extract.	Fat
. W. Johnson..	1	12.91	1.17	8.69	1.79	71.93	3.51	1.34	9.97	2.06	82.60	4.03
" "	2	20.67	1.17	7.81	0.93	66.35	3.07	1,48	9.85	1.17	83.63	3.87
" "	3	21.67	1.16	7.38	1.41	65.88	2.50	1.48	9·42	1.80	84.11	3.19
.....		18.41	1.16	7·96	1.38	68.02	3·03	1.43	9.75	1.68	83.45	3.69
.....		21.67	1.17	8.69	1.79	71.93	3.51					
.....		12.91	1.16	7.38	.93	65.88	2.50					
ł. C. Kedzie...	1	8.28	.62	10.94	..	80.16	..	.68	11.93	..	87.39	..
" ..	2	9.29	.65	9.71	..	80.35	..	.72	10.71	..	88.57	..
" ..	3	10.65	.62	10.00	..	78.73	..	.69	11.19	..	88.02	..
" ..	4	9.69	.66	8.94	..	80.71	..	.73	9.90	..	89.37	..
" ..	5	10.46	.66	10.63	..	78.25	..	.73	11.87	..	87.10	..
" ..	6	10.66	.63	9.69	..	79.02	..	.71	10.86	..	88.43	..
" ..	7	9.66	.64	11.00	..	78.70	..	.71	12.18	..	87.11	..
" ..	8	9.56	.67	9.80	..	79.97	..	.74	10.84	..	88.42	..
" ..	9	9.66	.64	11.01	..	78.69	..	.71	12.19	..	87.10	..
" ..	10	9.71	.66	10.75	..	78.88	..	.73	11.90	..	87.37	..
" ..	11	9.93	.63	11.25	..	78.19	..	.70	12.49	..	86.81	..
" ..	12	10.69	.64	9.62	..	79.05	..	.72	10.78	..	88.50	..
" ..	13	9.10	.65	10.50	..	79.75	..	.72	11.55	..	87.73	..
" ..	14	10.15	.48	11.59	..	77.78	..	.53	12.91	..	86.56	..
" ..	15	12.61	.63	12.25	..	74.51	..	.72	14.02	..	85.26	..
" ..	16	13.43	.72	10.94	..	74.91	..	.83	12.63	..	86.54	..
.....		10.22	.63	10.54	..	78.61	..	.70	11.74	..	87.56	..
.....		13.43	.72	12.25	..	80.71						
.....		9.10	.48	8.94	..	74.51						
R. C. Kedzie..	17	12.43	.59	13.56	..	73.42	..	.67	15.48	..	83.85	..
" ..	18	11.92	.59	13.31	..	74.18	..	.67	15.06	..	84.27	..
" ..	19	10.70	.57	11.37	..	77.36	..	.64	12.73	..	86.63	..
" ..	20	10.99	.57	11.37	..	77.07	..	.64	12.76	..	86.60	..
" ..	21	10.96	.69	13.31	..	75.04	..	.78	14.96	..	84.26	..
.....		11.40	.60	12.58	..	75.42	..	.68	14.19	..	85.13	..
.....		12.43	.69	13.56	..	77.36						
.....		10.70	.57	11.37	..	73.42						
R. C. Kedzie..	22	11.78	.49	12.25	..	75.49	..	.56	13.88	..	85.56	..
" ..	23	12.80	.55	12.50	..	74.15	..	.63	14.33	..	85.04	..
" ..	24	10.31	.60	10.94	..	78.15	..	.67	12.19	..	87.14	..
W. O. Atwater..	25	13.50	0.42	10.92	*none*	74.04	1.12	0.49	12.63	..	85.58	1.30
" ..	26	11.98	0.46	8.71	"	78.11	0.74	0.52	9.88	..	88.76	0.84
" ..	27	12.46	0.50	8.56	"	77.92	0.56	0.57	9.75	..	89.04	0.64
" ..	28	10.30	0.58	9.59	"	78.52	1.04	0.61	10.69	..	87.54	1.16

PRODUCTS.

No.	Variety.	Reference.
	Wheat Flour—(From Spring Wheat)—Cont'd.	
	Average of all varieties (28 analyses)	
	Maximum	
	Minimum	
1	Barley Meal	Rep. Mid. Ag. Ex. St. '77-8, p. 27
1	Rice Meal	" " "

PRODUCTS.

Analyst.	No.	Water	Ash	Albuminoids.	Fibre.....	N. fr. Extract	Fat.	Water-free.				
								Ash	Albumi-oids..	Fibre....	N. fr. Extract	Fat.
.....		10.84	.60	10.89	..	77.67		.67	12.22		87.11	
.....		13.50	.72	13.56	..	80.71						
.....		9.10	.42	8.56	..	73.42						
W. O. Atwater..	1	9.85	3.77	12 68	7.00	63.46	3.24	4.18	14.06	7.76	70.41	3.59
" ..	1	15.11	6.03	9.25	8.12	59.88	1.61	7.10	10.94	9.56	70.50	1.90

III. BY PRODUCTS

No.	Variety.	Reference.
1	Linseed Meal, sold in Conn	Rep. Mid. Ag. Ex. St. '77-8, p. 36
2	" " "	Rep. Conn. Ag. Ex. St., '79, p. 93
3	Ohio Round Cakes	Trans. High. and Ag. Soc., '55, July, p. 50,
4	Western Cake	
5	Boston Cake	
6	North American Cake	
7	" " "	
8	Albany Cake	
9	Finest American Cake	
10	" " "	
	Average (10 analyses)	.....
	Maximum	.....
	Minimum	.....
1	Cotton Seed Meal, sold in Conn	Rep. Mid. Ag. Ex. St. '77-8, p. 38
2	" " " " New Hampshire	Rep. Dept. Ag., '78, p. 146,
3	" " Cake " Conn	Trans. Ct. Ag. Soc., 1857, p. 84.
	Average (2 analyses)	.....
	Maximum	.....
	Minimum	.....
1	Palm Nut Meal, sold in New York City	Rep. Mid. Ag. Ex. St., '77, p. 38.
1	"Hominy Chop," sold in Conn	Rep. Ct. Ag. Ex. St., '79, p. 93,
2	" " " "	" " " "
1	"Corn Feed," Waste product from Starch manufature, sold in Conn	Rep. Ct. Ag. Ex. St., '78, p. 76,
2	"Starch Feed"	Rep. Mid. Ag. Ex. St., '77-8, p. 38
	Maize Cob.	
1	Maize Cob Immature Sweet, harvested Aug. 9, 1877, Conn	Rep. Ct. Ag. Ex. St., '78, p. 72,
2	Immature Sweet, Harvested Aug. 25, '77, Ct.	" " " "
3	Sweet, Harvested Sept. 25, 1877, Conn	" " " "
4	Ohio Dent, Crop, 1877, Conn	" " " "
5	Norfolk White. N. Carolina	" " " "
6	Tuscarora. Crop, 1877. Conn	" " " "
7	Vt. White Cap, " "	" " " "
8	Rowley " "	" " " "
9	Canada Yellow. Conn	" " " "
10*	Eight Rowed Yellow. Conn	Rep. Mid. Ag. Ex. St., '77-8, p. 29
11	Cob Meal. Maryland	U. S. Dept. Ag., '78, p. 136,
	Average (9 analyses)	.....
	Maximum	.....
	Minimum	.....

*These figures differ from those given in *loc. cit.*, which have been corrected by the analyst.

AND REFUSE.

Analyst.	No.	Water	Ash	Albuminoids.	Fiber.....	N. fr. Extract...	Fat.	Water-free.				
								Ash	Albuminoids..	Fiber ...	N. fr. Extract.	Fat.
W.O. Atwater	1	9.13	8.16	32.43	7.26	31.45	11.57	8.98	35.69	7.99	34.61	12.73
S.W. Johnson	2	10.76	6.71	35.64	8.86	35.22	2.81	7.50	39.92	9.91	39.52	3.15
	3	8.70	5.17	30.94	4.48	37.54	13.17	5.66	33.89	4.91	41.12	14.42
	4	9.08	5.49	28.45	5.52	35.79	15.67	6.03	31.26	6.07	39.39	17.25
	5	8.80	7.22	28.32	8.37	33.82	13.47	7.91	31.05	9.18	37.10	14.76
	6	9.32	7.24	26.00	7.83	38.02	11.59	7.98	28.67	8.63	41.94	12.78
Dr. Anderson.	7	9.76	5.73	29.50	(	)	9.57	6.32	32.70	(	)	10.61
	8	8.54	6.85	27.17	..	45.44	16.15	7.49	29.70		50.37	17.65
	9	9.96	6.48	27.82	..	41.29	10.96	7.20	30.92	..	45.16	12.17
	10	9.72	5.56	28.07	15.73	29.05	13.18	6.15	31.99	17.49	32.22	14.60
					12.27	31.20				13.59	34.57	
.....		9.38	6.46	29.43	*8.80	*34.12	11.81	7.13	32.48	9.70	37.66	13.03
.....		10.76	8.16	35.64	15.73	38.02	16.15					
.....		8.54	5.17	26.00	4.48	29.05	2.81					
W.O. Atwater	1	7.24	5.83	41.45	3.08	24.39	18.01	6.28	44.69	3.32	26.29	19.42
P. Collier....	2	8.27	7.77	46.37	..	..	..	8.48	50.47	..	..	..
S.W. Johnson	3	6.82	7.80	44.41	11.76	12.74	16.47	8.37	47.65	12.61	13.70	17.67
.....		7.03	6.82	42.93	7.42	18.56	17.24	7.33	46.17	7.98	19.98	18.54
.....		8.27	7.80	46.37	11.76	24 39	18.01					
.....		6.82	5.83	41.45	3.08	12.74	16.47					
W.O. Atwater	1	7.90	3.99	13.53	18.75	41.05	14.78	4.33	14.69	20.36	44 57	16.05
S.W. Johnson	1	13.53	2.44	9.50	3.19	62.02	9.32	2.82	10.88	3.70	71.83	10.77
" "	2	11.56	2.67	9.82	4.79	62.58	8.58	3.01	11.10	5.43	70.78	9.68
W.O. Atwater	1	62.27	.27	5.67	1.58	28.90	1.31	.70	15.03	4.19	76.62	3.46
	2	72.19	.12	3.56	3.36	18.78	1.99	.43	12.88	12.05	67.49	7.15
S.W. Johnson	1	(10.10	6.70	8.56	21.40	51.14	2.10)	7.45	9.52	23.80	56.89	2.34
" "	2	(9.02	2.60	3.00	29.63	54.91	0.84)	2.86	3.30	32.56	60.36	.92
" "	3	8.82	1.47	2.69	30.57	55.53	0.92	1.61	2.95	33.54	60.89	1.01
" "	4	8.21	.97	2.56	30.99	56.99	.28	1.06	2.79	33.75	62.10	.30
" "	5	7.18	1.33	1.81	29.80	59.57	.31	1.43	1.94	32.10	64.20	.33
" "	6	8.37	1.57	2.56	30.01	57.15	.34	1.71	2.79	32.75	62.38	.37
" "	7	8.40	.96	2.63	30.47	57.21	.33	1.05	2.87	33.27	62.45	.36
" "	8	8.05	.98	1.81	32.39	56.54	.23	1.07	1.97	35.21	61.50	.25
" "	9	7.52	2.14	2.35	29.76	57.72	.51	2.31	2.54	32.10	62.43	.55
W.O. Atwater	10	11.45	1.36	1.23	38.26	47.62	.08	1.52	1.38	43.21	53.80	.09
P. Collier....	11*	14.42	1.12	2.33	36.10	45.31	.72	1.31	2.72	42.18	52.95	.84
		9.16	1.32	2.22	32.04	54.85	.41	1.45	2.44	35.31	60 35	.45
		14.42	2·14	2.69	38.26	59.57	.92					
		7.18	.96	1.23	29.76	45.31	.08					

*Average of 8 analyses.

III. BY PRODUCTS

No.	Variety.	Reference.
	Wheat Bran and Middlings.	
1	Coarse Wheat Feed, from White Wheat, Conn.	Rep. Ct. Ag. Ex. St., '77, p. 59
2	Coarse Wheat Feed, from Red Wheat, Conn...	" " "
3	Western Wheat Bran, Conn.....	" " "
4	Fine Feed, Ground Bran, Conn.....	" " "
5	Wheat Middlings, Conn.....	" " "
6	Wheat Shorts, Conn.....	Rep. Mid. Ag. Ex. St., '77-8, p. 26
7	No. 2 Middlings, Conn.....	" " "
8	No. 1 Middlings, Conn.....	" " "
9*	Purified Middlings, Conn.....	" " "
10	St. Louis Shorts, 1872.....	Bull. Bussy Inst., 1874, p. 27
11	Illinois Shorts.....	" " "
12	Michigan Shorts.....	" " "
13	St. Louis Middlings.....	" " "
14	Illinois Middlings.....	" " "
15	St. Louis Ship Stuff.....	" " "
16	Bran, Mich.....	Rep. Mich. Bd. of Ag., '78, p. 419
17	Shorts, Mich.....	" " "
18	Middlings, Mich.....	" " "
19	Mill Feed, Mich.....	" " "
	Average (18 analyses).....	.....
	Maximum.....	.....
	Minimum.....	.....
	Rye Bran.	
1	Sold in Conn.....	Rep. Ct. Ag. Ex. St., '78., p. 73
2	" "	Rep. Mid. Ag. Ex. St., '77, p. 27
	Average, (2 analyses).....	.....
	Malt Sprouts.	
1	Sold in Conn.....	Rep. Ct. Ag. Ex. St., '77, p. 30
	Brewers Grains.	
1	Sold in New York, 1 bush. — 70 lbs.....	Rep. Mid. Ag. Ex. St. '77-8, p. 38
2	" " 1 bush. — 40 lbs.....	Rep. Ct. Bd. Ag., '72, p. 423
3	" "	Rep. Dept. Ag., '78, p. 137...
	Date Stones.	
1	From Light Colored, Sugar Cured Dates.....	Bull. Bussey, Inst., 76, p. 375
2	From Dark Colored, Molasses Cured Dates....	" " "
1	Peach Stones.....	" " "
	Prune Stones.	
1	From French Prunes.....	" " "

* Has more nearly the composition of flour.

AND REFUSE—Continued.

Analyst.	No.	Water	Ash	Albuminoids.	Fibre.	N. fr. Extract	Fat.	Water-free. Ash	Albumin-oids.	Fibre.....	N. fr. Extract.	Fat.
S.W. Johnson	1	10.87	5.75	13.63	7.56	58.92	3.27	6.46	15.30	8.47	66.13	3.64
" "	2	11.14	5.99	12.13	9.31	58.36	3.07	6.73	13.65	10.47	65.65	3.50
" "	3	12.12	6.33	13.50	8.79	55.90	3.36	7.21	15.36	10.11	63.48	3.84
" "	4	10.47	5.56	13.88	7.98	58.88	3.23	6.22	15.51	8.92	65.73	3.62
" "	5	10.56	3.45	14.22	5.35	62.90	3.52	3.86	15.91	5.97	70.32	3.94
W. O. Atwater	6	11.31	3.94	13.91	6.34	62.10	2.50	4.44	15.68	7.04	70.02	2.82
" "	7	12.27	4.06	13.33	7.45	61.21	3.68	4.63	15.19	8.50	68.63	3.05
" "	8	11.32	1.39	10.48	3.88	70.86	2.07	1.57	11.82	4.38	79.90	2.33
" "	(9	12.35	0.50	10.40	none	75.50	1.24)	0.57	11.87	..	86.14	1.42
F. H. Storer.	10	12.23	4.53	12.06	7.12	60.05	4.01	5.17	13.73	8.11	68.44	4.55
" "	11	10.96	4.24	11.13	7.29	62.32	4.06	4.76	12.51	8.20	69.96	4.57
" "	12	11.77	4.06	12.75	10.47	56.30	4.65	4.59	14.46	11.87	63.80	5.28
" "	13	12.08	1.57	11.06	3.57	69.21	2.51	1.79	12.58	4.06	78.72	2.85
" "	14	13.30	2.71	10.13	5.35	64.80	3.71	3.12	11.68	6.17	74.75	4.28
" "	15	11.81	2.25	11.12	5.59	66.46	2.77	2.55	12.67	6.34	75.32	3.14
R. C. Kedzie.	16	11.65	5.63	14.00	9.13	55.56	4.03	6.37	15.83	10.31	62.93	4.56
" "	17	11.26	3.95	15.13	7.46	57.35	4.85	4.46	17.07	8.41	64.59	5.47
" "	18	11.27	2.11	13.75	3.47	65.71	3.69	2.38	15.49	3.91	74.06	4.16
" "	19	11.29	2.24	11.38	5.22	65.52	4.35	2.50	12.83	5.88	73.89	4.90
.....		11.53	3.82	12.64	6.74	61.81	3.46	4.31	14.28	7.60	69.90	3.91
.....		13.30	6.33	14.22	10.47	70.86	4.85					
.....		10.47	1.39	10.13	3.47	55.56	2.07					
S.W. Johnson	1	10.30	3.54	16.81	4.07	62.68	2.60	3.95	18.74	4.54	69.87	2.90
W. O. Atwater	2	12.88	2.89	12.58	2.54	66.96	2.15	3.32	14.44	2.92	76.85	2.47
.....		11.59	3.21	14.69	3.31	64 82	2.38	3.63	16.62	3.74	73.32	2.69
S.W. Johnson	1	11.55	6.68	25.91	9.30	45.47	1.09	7.54	29.29	10.52	51.52	1.13
W. O. Atwater	1	75.24	0.29	5.94	3.87	13.19	1.47	1.18	24.06	15.62	53.20	5.92
S.W. Johnson	2	78.50	1.07	4.69	3.11	12.63	..	4.98	21.81	14.46	58.00	0.72
P. Collier....	3‡	10.24	2.70	21.66	14.88	43.86	6.66	3.01	24.11	16 57	48.89	7.42
F. H. Storer.	1	7.71	1.05	5.16	24.07	53.06	8.95	1.13	5.60	26.09	57.59	9.69
" "	2	10.83	1.02	5.75	22.06	52.29	8.05	1.14	6.45	24.73	58.65	9.03
" "	1	5.53	0.36	0.58	70.63	22.81	0.09	.38	.61	74.73	24.18	.10
" "	1	10.96	0.40	0.31	78.74	38.87	0.72	.45	.35	54.76	43.63	.81

IV. HAY.

No.	Variety.	Reference.
	Timothy Hay (Phleum pratense).	
1	Crop 1876, Maine. Clayey loam, heavy, wet. Since '72 in grass. Well headed out.....	Rep. Mid. Ag. Ex. St. '77-8, p. 31
2	Crop 1876, Maine. Clayey loam, heavy, wet. Since '72 in grass. In full blossom.....	" " "
3	Crop 1876, Maine. Clayey loam, heavy, wet. Since '72 in grass. Past blossom.....	" " "
4	Crop 1876, Maine. Clayey loam, heavy, wet. Since '72 in grass. Nearly ripe.....	" " "
5	Crop of 1879, Conn.....	Rep. Ct. Ag. Ex. St., '79, p. 80
6	New Hampshire, July 1, 1878.....	" " "
7	New Hampshire, July 11, 1878.....	" " "
8	Crop 1877, Conn.....	" " "
9	" 1877, Conn.....	" " "
	Average (9 analyses).....	....
	Maximum.....	....
	Minimum.....	....
	Hay, mostly Timothy and Red-top.	
1	Crop 1879, Conn.....	Rep. Ct. Ag. Ex. St., '79, p. 80
2	" 1879, Conn.....	" " "
3	" 1877, Conn.....	" " "
4	" 1877. Conn.....	" " "
	Hay, mostly Timothy and Blue-grass	
5	Crop 1877, Conn.....	" " "
	Hay, mixed Meadow Grasses.	
6	Crop 1877, Conn.....	" " "
7	" 1877, Conn.....	" " "
	Average (7 analyses).....	....
	Maximum.....	....
	Minimum.....	....
	Hay, containiug much Clover.	
1	Crop 1879, Conn.....	Rep. Ct. Ag. Ex. St., '79, p. 80
2	" 1879, Conn.....	" " "
3	" 1877, Conn.....	" " "
4	" 1877, Conn.....	" " "
5	" 1777, Conn.....	" " "
	Average (5 analyses).....	....
	Maximum.....	....
	Minimum.....	....

IV. HAY.

Analyst.	No.	Water	Ash.	Albuminoids.	Fibre	N. fr. extract	Fat	Water-free.				
								Ash.	Albuminoids....	Fibre....	N. fr. extract...	Fat.
W.O. Atwater	1	12.5*	4.10	8.37	28.90	44.42	1.71	4.69	9.57	33.03	50.74	1.95
"	2	12.5*	3.81	6.23	29.12	46.63	1.71	4.35	7.12	33.28	53.29	1.96
"	3	12.5*	3.53	6.18	29.56	46.70	1.53	4.15	7.06	33.78	53.26	1.75
"	4	12.5*	3.22	5.86	31.00	45.69	1.73	3.65	6.81	35.43	52.19	1.97
S.W. Johnson	5	14.3*	3.27	4.88	32.81	43.29	1.45	3.80	5.69	38.28	50.55	1.68
"	6	14.3*	4.10	6.20	25.30	48.10	2.00	4.78	7.24	29.53	56.12	2.33
"	7	14.3*	3.80	5.30	27.50	47.20	1.90	4.43	6.19	32.09	55.07	2.22
"	8	14.3*	4.38	5.57	29.48	45.19	1.08	5.11	6.50	34.40	52.74	1.25
"	9	14.3*	4.60	6.90	26.80	45.40	2.00	5.37	8.05	31.28	52.99	2.33
.....	....	13.50	3.87	6.16	28.94	45.85	1.68	4.47	7.11	33.45	53.03	1.94
.....	....	14.30	4.60	8.37	32.81	48.10	2.00					
.....	....	12.50	3.22	4.88	25.30	43.29	1.08					
S.W. Johnson	1	14.3*	5.57	7.85	24.72	45.08	2.48	6.50	9.15	28.85	52.60	2.90
"	2	14.3*	6.86	8.97	28.45	39.20	2.22	8.00	10.46	33.20	45.74	2.60
"	3	14.3*	4.81	6.02	26.54	46.88	1.45	5.61	7.02	39.98	54.71	1.68
"	4	14.3*	4.90	7.50	26.30	45.30	1.70	5.72	8.75	30.70	52.85	1.98
"	5	14.03	4.70	7.00	26.90	45.40	1.70	5.48	8.17	31.41	52.96	1.98
"	6	14.3*	4.23	7.02	27.82	45.00	1.63	4.93	8.18	32.47	52.52	1.90
"	7	14.3*	4.56	6.50	25.89	47.33	1.43	5.31	7.57	30.24	55.23	1.65
.....	....	14.30	5.09	7.26	26.66	44.89	1.80	5.93	8.47	31.10	52.40	2.10
.....	....	.....	6.86	8.97	28.45	47.33	2.48					
.....	....	.....	5.23	6.02	24.72	39.20	1.43					
S.W. Johnson	1	14.3*	5.30	14.42	19.66	43.23	3.09	6.19	16.82	22.95	50.54	3.60
"	2	14.3*	6.49	11.62	23.06	42.07	2.46	7.57	13.56	26.90	49.09	2.88
"	3	14.3*	5.10	10.60	24.90	42.40	2.70	5.95	12.37	29.06	49.47	3.15
"	4	14.03	4.74	9.06	28.19	42.21	1.50	5.48	10.57	32.89	49.31	1.75
"	5	14.3*	5.10	9.00	24.90	44.90	1.80	5.95	10.51	29.06	52.38	2.10
.....	....	14.3*	5.34	10.94	24.14	42.97	2.31	6.24	12.77	28.17	50.13	2.69
.....	....	.....	6.49	14.42	28.19	44.90	3.09					
.....	....	.....	4.74	9.00	19.66	42.07	1.50					

*Reckoned by the analyst to a uniform water content. No. 3 timothy, corrected by the analyst. Figures different from those given in *loc. cit.*

IV. HAY—CONTINUED.

No.	Variety.	Reference.
	Clover Hay (Trifolium pratense).	
1	Maine. Crop 1875. Poor loam, well manured, cut just before blossom	Rep. Mid. Ag. Ex. St., '77-8, p. 32
2	Maine. Crop 1876. Poor loam, well manured, cut in full blossom	" " "
3	Maine. Crop 1875. Poor loam, well manured, cut when heads began to brown	Rep. Mid. Ag. Ex. St. '77-8, p. 32
4	Maine. Crop 1875. Poor loam, well manured, nearly ripe	" " " "
	Average, (4 analyses)	
	Maximum	
	Minimum	
	Hay from Hungarian grass.	
1	Conn. Crop 1776. Cut July 17. Heads partly filled. Seeds but little developed	Rep. Mid. Ag. Ex. St. '77-8, p. 33
2	Conn. Crop 1876. Cut Aug. 3. Heads well filled. Seeds soft	" " " "
3	Conn. Crop 1876. Cut Aug. 18. Seeds falling out	" " " "
4	Conn. Crop 1877	Rep. Ct. Ag. Ex. St. '79, p. 80
	Average (4 analyses)	
	Maximum	
	Minimum	
	Low Meadow Hay.	
1	Cut from low meadows in Ct. Chiefly Carex stricta, Lamarck. C. stellulata v. Scirpoides, Gr., and Eleocharis tenuis Schultes.	Rep. Ct. Bd. Ag., '72, p. 422.
2	Cut June 11, 1873. Small sample gathered by hand. Mass. Carex stricta. Going to seed. Many seeds included	Bull, Bussey Inst., '75, p. 345.
3	Cut June 16, 1873 Small sample gathered by hand. Mass. Carex stricta	" " "
4	Cut Aug., 1874. Mass. "Bog Hay," Carex stricta. No seeds or flowers	" " "
5	Cut 1874. Mass. "Bog hay," Carex stricta.	" " "
6	Cut Dec. 26, 1874. Mass. "Bog hay," Carex stricta. Dead and weather beaten	Bull, Bussey Inst., '75, p. 345.
7	Swale Hay 1878. N. Hampshire	Rep. U. S. Dept. Ag. '78, p. 146
8	Conn. 1877	Rep. Ct. Ag Ex. St., '79, p. 80
9	" 1877	" " "
	Average (9 analyses)	
	Maximum	
	Minimum	

IV. HAY—CONTINUED.

Analyst.		Water	Ash.	Albuminoids.	Fibre.....	N. fr. Extract	Fat.	Water-free.				
								Ash.	Albumi-noids.	Fibre....	N. fr. Extract.	Fat
W.O. Atwater	1	14.3*	7.15	12.23	23.79	41.06	1.47	8.34	14.27	27.75	49.93	1.71
"	2	14.3*	6.56	11.56	23.82	41.72	2.04	7.65	13.48	27.79	48.70	2.38
W.O. Atwater	3	14.3*	6.29	11.25	25.60	41.01	1.55	7.34	13.13	29.87	47.86	1.80
" "	4	14.3*	5.57	8.87	27.22	41.98	2.06	6.50	10.35	31.75	49.00	2.40
.....		14.3	6.39	10.98	25.10	41.45	1.78	7.46	12.81	29.30	48.37	2.06
.....		14.3	7.15	12.23	27.22	41.98	2.06					
.....		14.3	5.57	8.87	23.79	41.01	1.47					
W.O. Atwater	1	16.7*	7.17	10.67	28.91	34.85	1.70	8.60	12.81	34.69	41.76	2.04
" "	2	16.7*	4.28	8.03	27.55	41.91	1.53	5.13	9.66	33.06	50.35	1.83
" "	3	16.7*	5.29	5.72	28.94	41.94	1.42	6.34	6.87	34.73	50.36	1.70
S.W. Johnson	4	16.7*	6.34	6.09	27.17	42.40	1.30	7.57	7.35	32.60	50.97	1.51
.....		16.7	5.77	7.63	28.14	40.28	1.48	7.00	9.16	33.76	48.31	1.77
.....		16.7	7.17	10.67	28.94	42.40	1.70					
.....		16.7	4.28	5.72	27.30	34.85	1.30					
S.W. Johnson	1	14.3	3.3	7.8	31.6	39.9	3.1	3.85	9.10	36.87	46.56	3.62
F. H. Storer.	2	7.46	6.52	10.41	33.60	39.80	2.21	7.05	11.25	36.23	43.08	2.39
" "	3	7.33	6.17	9.38	33.91	41.08	2.13	6.67	10.11	36.57	44.35	2.30
" "	4	7.96	5.65	6.31	33.55	43.53	3.00	6.14	6.86	36.44	47.30	3.26
" "	5	8.38	5.43	7.44	33.30	43.53	1.92	5.80	8.12	36.36	47.63	2.09
" "	6	9.32	4.42	4.63	39.99	40.90	0.74	4.87	5.10	44.09	45.12	.82
P. Collier....	7	6.41	6.33	7.07	21.39	55.17	3.63	6.76	7.55	22.85	58.96	3.88
S.W. Johnson	8	14.3	5.40	6.70	26.20	46.10	1.30	6.30	7.80	30.58	53.81	1.51
" "	9	14.3	8.56	7.27	23.22	44.49	2.16	9.97	8.47	27.10	51.94	2.52
.....		9.97	5.76	7.44	30.75	43.84	2.24	6.39	8.22	34.15	48.76	2.48
.....		14.30	6.52	10.41	39.99	55.17	3.63					
.....		6.41	3.30	4.63	21.39	39.80	0.74					

*Reckoned by the analyst to a uniform water content. No. 3 Timothy corrected by the analyst. Figures different from those given in *loc. cit.*

IV. HAY—Continued.

No.	Variety.	Reference.
	Salt Marsh Hay.	
1	Crop 1872. Mass. Brizopyrum spicatum, Spartina juncea and some Glyceria maritima	Bull, Bussey Inst., '75, p. 341.
2	Crop 1874. Mass. Brizopyrum spicatum, some Juncus bulbosus	" " "
3	Crop 1874. Mass. Mostly Brizopyrum spictatum, some Juncus bulbosus	" " "
4	Crop 1874. Mass. Mostly Spartina juncea	" " "
5	Crop 1874, Mass. Almost all Spartina juncea.	Bull, Bussey Inst., '75, p. 341,
6	Crop 1872, Mass. Pure Spartina stricta var. alterniflora	" " " p. 342,
7	Crop 1874, Mass. Pure Spartina stricta var. alterniflora	" " " "
8	1874, Mass. Mostly spartina stricta. Sample not taken from a *crop*	" " " "
9	Mass. Juncus bulbosus. Upper parts of stalks and empty seed vessels. Sample not taken from a *crop*	" " " "
10	Mass. Juncus bulbosus. Many seeds on the stalks	" " " "
	Average (10 analyses)	
	Maximum	
	Minimum	
	Hay from Various Grasses.	
1	Calamagrostis Canadensis, Blue Joint Grass, June '76, Mass. In blossom	Bull, Bussey Inst., '77, p. 131.
2	Calamagrostis Canadensis, Blue Joint Grass, July '76, Mass. In blossom	" " " "
	Average (2 analyses)	
1	Phalaris arundinacea, Reed Canary Grass, June '76, Mass. In bud	Bull, Bussey Inst., '77, p. 132,
2	Phalaris arundinacea, Reed Canary Grass, June '76, Mass. In bud	" " " "
	Phalaris arundinacea, Leaves. 41.29 per cent. of the whole	4th Rep Mass. Bd. Ag., '56, p. 83,
	Stalks 52.12 per cent	" " " "
	Joints 6.59 per cent	" " " "
3	Composition of the whole	" " " "
	Average (3 analyses)	
1	Hierochloa borealis, Vanilla Grass, Ill	Rep. U. S. Dept. Ag., '78, p. 184,
1	Eleusine Indica, Wire Grass, Texas, Ala., Miss., Ga	" " " "

IV. HAY—CONTINUED.

Analyst.	No.	Water	Ash.	Albuminoids.	Fibre.	N. fr. extract	Fat.	Water-free.				
								Ash.	Albuminoids...	Fibre....	N. fr. extract...	Fat.
F. H. Storer	1	7.93	6.29	7.09	31.40	44.39	2.90	6.84	7.69	34.09	48.23	3.15
"	2	8.91	7.79	7.53	32.90	39.73	3.14	8.56	8.25	36.11	43.72	3.45
"	3	7.84	7.10	7.79	33.84	40.66	2.77	7.68	8.46	36.69	44.10	3.00
"	4	8.70	7 51	4.88	28.71	48.52	1.68	8.22	5.35	31.43	53.16	1.84
"	2	8.61	5.97	4.38	37.91	41.30	1.83	6.54	4.80	41.46	45.20	2.00
"	6	11.70	9.84	4.33	30.54	41.30	2.29	11.15	4.90	34.58	46.77	2.60
"	7	17.47	9.56	5.55	30.01	35.15	2.26	11.59	6.72	36.36	42.60	2.73
"	8	18.61	11.81	5.38	27.64	34.07	2.49	14.51	6.61	33.96	41.86	3.06
"	9	7.17	4.90	7.39	35.90	42.55	2.09	5.28	7.96	38.69	45.82	2.25
"	10	10.25	5.48	6.18	30.43	45.15	2.51	6.11	6.89	33.91	50.29	2.80
.....	....	10.72	7.62	6.05	31.93	41.29	2.39	8.53	6.78	35.76	46.25	2.68
.....	....	18.61	11.81	7.79	37.91	48.52	3.14					
.....	....	7.17	4.90	4.33	27.64	34 07	1.68					
F. H. Storer,	1	9.77	4.19	6.72	40.00	37.18	2.14	4.65	7.45	44.34	41.23	2.33
"	2	9.22	4.30	5.59	39.47	39.36	2.06	4.74	6.15	43.48	43.38	2.25
.....	....	9.49	4.25	6.15	39.74	38.27	2.10	4.69	6.80	43.92	42.27	2.32
F. H. Storer,	1	9.56	5.99	10.00	32.90	38.86	2.69	6.63	11.06	36.39	42.93	2.99
"	2	10.11	8.18	11.09	33.20	34.06	3.36	9.10	12.32	36.92	37.93	3.73
E.N.Horsford	....	10.98	8.85	7.06		72.96						
"	....	9.58	3.58	.50		86.33						
"	....	10.72	3.50	2.81		82.91						
"	3	10.42	5.31	3.44		80.83		5.93	3.83		90.24	
.....	....	10.03	6.49	8.17		75.31		7.22	9.07		83.71	
Peter Collier,	*1	.....	.....	.....	.....	.....	....	8.41	14.31	23.30	49.86	4.12
.....	*1	.....	.....	.....	.....	.....	....	9.12	13.72	31.29	43.71	2.16

*These analyses of grass were reduced by the analyst to a water-free basis. The original water content was not given.

IV. HAY—Continued.

No.	Variety.	Reference.
2	Eleusine Indica, Wire Grass, Texas, Ala., Miss., Ga	Rep. U. S. Dept. Ag., '78, p. 184.
3	Eleusine Indica, Wire Grass, Texas, Ala., Miss., Ga	" " " "
1	Uniola latifolia, Fescue Grass	" " " "
1	Cynodon dactylon, Bermuda Grass, Ala., Miss	" " " "
2	Cynodon dactylon, Bermuda Grass, Ala., Miss	" " " "
1	Sporobolus Indicus, Smut Grass, Miss	" " " "
1	Andropogon Virginicus, Broom Grass, Texas	" " " "
1	Andropogon scoparius, Ala	" " " "
	Poa pratensis, Ky., Blue Grass, Wis	" " " "
1	Poa serotina, Fowl Meadow Grass, Wis	" " " "
1	Dactyloctenium Aegyptiacum. Willd. Egyptian Grass. Ga	Rep., U. S. Dept. Ag. 78, p 184.
1	Panicum sanguinale, Crab Grass. Miss., Ala	" " " " "
1	Panicum jumentorum, True Guinea Grass	" " " " "
1	" obtusum, Texas	" " " " "
1	" virgatum. Tall Panic Grass, Texas or Ala	" " " " "
2	Panicum vergatum. Tall Panic Grass. Texas or Ala	" " " " "
1	Panicum Texanum. Texas Millet. Texas,	" " " " "
1	" crus-galli Barn Yard Grass, Texas, Ala., Miss	" " " " "
1	Panicum filiforme. Slender Crab Grass, Ala	" " " " "
1	Sorghum halapense. Johnson Grass. Ala.,	" " " " "
1	" avenaceum. Indian Grass	" " " " "
1	Muhlenbergia diffusa. Drop Seed. Tex	" " " " "
1	Bromus unioloides. Schrader's Grass	" " " " "
1	Bromus carinatus. Brome Grass. Ill	" " " " "
1	Agrostis exarata. Brown top. Wis	" " " " "
1	Paspalum laeve. Water Grass, Texas	" " " " "
1	Setaria setosa. Bristly Fox Tail.—Bristle Grass, Texas	" " " " "
1	Leptochola mecronata, Feather Grass. Ala	" " " " "
1	Tripsacum dactyloides. Game Grass, Miss	" " " " "
1	Tricuspis seslerioides. Tall Red Top. Texas.	" " " " "

IV. HAY—CONTINUED.

Analyst.	No.	Water	Ash.	Albuminoids.	Fibre.	N. fr. extract	Fat.	Water-free.				
								Ash.	Albuminoids.	Fibre.	N. fr. extract.	Fat.
P. Collier....	*2	.....	.....	.....	.....	.....	....	6.33	13.28	22.38	55.94	2.07
.....	*3	.....	.....	.....	.....	.....	....	7.07	12.23	21.53	56.61	2.56
.....	*1	.....	.....	.....	.....	.....	....	11.38	11.29	38.67	35.43	3.23
.....	*1	.....	.....	.....	.....	.....	....	6.16	11.15	24.55	55.92	2.22
.....	*2	.....	.....	.....	.....	.....	....	7.96	13.59	23.57	53.29	1.59
.....	*1	.....	.....	.....	.....	.....	....	6.19	12.46	25.14	52.91	3.30
P. Collier....	*1	.....	.....	.....	.....	.....	....	6.44	13.00	33.73	45.12	1.71
.....	*1	.....	.....	.....	.....	.....	....	3.90	6.21	24.91	63.39	1.59
.....	*1	.....	.....	.....	.....	.....	....	5.18	11.54	27.94	52.48	2.86
.....	*1	.....	.....	.....	.....	.....	....	4.74	8.91	25.62	57.25	3.48
P. Collier....	*1	.....	.....	.....	.....	.....	....	6.90	9.01	17.48	64.65	1.96
"	*1	.....	.....	.....	.....	.....	....	10.68	9.99	32.80	43.64	2.89
"	*1	.....	.....	.....	.....	.....	....	8.37	8.95	31.76	49.04	1.58
"	*1	.....	.....	.....	.....	.....	....	8.75	7.28	33.33	48.38	2.27
"	*1	.....	.....	.....	.....	.....	....	4.84	5.01	37.38	51.07	1.70
"	*2	.....	.....	.....	.....	.....	....	3.56	4.58	28.87	60.07	1.92
"	*1	.....	.....	.....	.....	.....	....	6.63	5.61	27.68	57.54	2.54
"	*1	.....	.....	.....	.....	.....	....	10.14	4.14	32.27	51.34	2.11
"	*1	.....	.....	.....	.....	.....	....	4.65	3.32	26.78	63.71	1.54
"	*1	.....	.....	.....	.....	.....	....	4.85	13.18	25.15	53.96	2.86
"	*1	.....	.....	.....	.....	.....	....	5.63	3.29	36.70	52.71	1.67
"	*1	.....	.....	.....	.....	.....	....	7.61	10.06	23.37	56.14	1.82
"	*1	.....	.....	.....	.....	.....	....	7.78	12.45	24.31	52.23	3.23
"	*1	.....	.....	.....	.....	.....	....	10.31	9.98	26.90	50.11	2.70
"	*1	.....	.....	.....	.....	.....	....	5.62	10.65	24.59	56.83	2.31
"	*1	.....	.....	.....	.....	.....	....	6.43	8.14	27.72	55.95	1.76
"	*1	.....	.....	.....	.....	.....	....	6.71	8.61	32.76	50.41	1.51
"	*1	.....	.....	.....	.....	.....	....	8.98	7.80	32.16	48.98	2.08
"	*1	.....	.....	.....	.....	.....	....	5.96	8.62	26.59	56.43	2.40
"	*1	.....	.....	.....	.....	.....	....	4.55	6.32	37.86	49.22	2.50

*These analyses of grass were reduced by the analyst to a water-free basis. The original water content was not given.

V. VARIOUS PLANTS AND WEEDS.

No.	Reference and remarks.	Reference.
	Air Dry.	
1	Juncus effusus. Aug., 1874, Mass.....	Bull. Bussey Inst., '75, p. 351.
2	Ranuculus acris. June, 1873, Mass.	" " " "
3	Leucanthemum vulgare. In full flower, June, 1872, Mass.....	" " " "
4	Osmunda regalis. 1874, Mass.....	" " " "
5	Desmodium Beggar Lice.....	Rep. U. S. Dept. Ag., '78, p. 184.
6	Lespedeza striata. Japanese Clover, Ala....	" " " "
7	Lathyrus maritimus. Mass.....	Bull. Bussey Inst., '75, p. 351.
8	" " Me....	" " " "
9	" " Mass.....	" " " "
	Fresh.	
1	Leotodon taraxacum. Dandelion. May, '75, Mass	Bull. Bussey Inst., '77, p. 117.
2	Urtica dioica. Nettle. Mass. May, 1876....	" " " 119.
3	Plantago major. Common Plantain. Mass., May, 1876.....	" " " 123.
4	Portulaca oleracea. Purslane. Mass., July, 1876.....	" " " 126.
5	Chenopodium album. Pig Weed. Mass., Aug., 1876.....	" " " 127.
6	Equisetum arvense. Scouring rush. Fertile stems. April, 1876.....	" " '78, p. 167.
7	Equisetum arvense. Steril[illegible]s. May, '76.	" " " "

V. VARIOUS PLANTS AND WEEDS.

Analyst.	No.	Water	Ash.	Albuminoids.	Fibre.....	N. fr. extract	Fat.	Water-free.				
								Ash-	Albumin-oids....	Fibre....	N. fr. ex-tract...	Fat.
F. H. Storer.	1	6.88	2.63	6.75	41.48	42.26	....	2.83	7.25	44.44	45.00	4.8
"	2	8.24	5.21	10.66	30.70	41.55	3.64	5.68	11.60	33.44	45.32	3.96
"	3	10.87	6.44	7.00	31.00	42.27	2.42	7.23	7.86	34.79	47.51	2.71
"	4	8.23	6.73	7.38	25.59	49.10	2.97	7.33	8.04	27.88	53.52	3.23
P. Collier....	*5	.....	.....	.....	.....	.....	....	7.56	22.22	25.39	43.04	2.79
"	*6	.....	.....	.....	.....	.....	....	4.33	15.11	23.77	52.39	4.40
F. H. Storer.	7	7.88	6.99	23.25	29.35	27.58	4.95	7.59	25.24	31.87	29.92	5.38
"	8	7.18	6.54	14.66	30.02	36.64	4.96	7.05	15.80	32.35	39.46	5.34
"	9	7.79	8.60	18.19	26.99	35.39	3.04	9.32	19.74	29.28	38.37	3.29
"	1	85.54	1.99	2.81	1.52	7.45	0.69	13.74	19.38	10.52	51.59	4.77
"	2	82.44	2.30	5.50	1.96	7.13	0.67	13.14	31.32	11.15	40.56	3.83
"	3	81.44	2.16	2.65	2.09	11.19	0.47	11.64	14.29	11.27	60.27	2.53
"	4	92.61	1.56	2.24	1.03	2.16	0.40	21.06	30.25	13.96	29.38	5.35
"	5	80.80	3.02	3.94	2.55	8.93	0.76	15.76	20.61	13.25	46.44	3.94
"	6	87.28	1.60	1.86	1.87	7.05	0.34	12.55	14.62	14.72	55.43	2.68
"	7	85.63	1.74	3.34	2.49	6.04	0.76	12.12	23.26	17.31	42.00	5.31

VI. STRAW AND

No.	Variety.	Reference.
	Old Straw.	
1	The straw from Oats No. 2, Conn.....	Rep.Mid.Ag.Ex.St.'77-8,p. 37
	Rye Straw.	
1	Conn. Raised on heavy loam. 16 bush. rye per acre.....	" " "
	Buckwheat Straw.	
1	Conn.....	Bull. Bussey Inst., '77, p. 54.
2	Conn.....	" " "
	Cow Pea Vines (Dolichos).	
1	Equal parts of black and yellow Cow Pea Vines	Rep.N.C.Ag.Ex.St.,'79,p.115
	Maize Fodder and Stover (Fresh).	
1	†Cut July 25, before tassels appeared.....	Rep. Ct. Ag. Ex. St., '78,p. 60
2	†Cut August 9, in full silk.....	" " "
3	†Cut August 25, kernels full size.....	" " "
4	†Cut September 25, nearly dry.....	" " "
5	*Southern White Fodder, Conn. Cut when tassels began to appear.....	Rep.Mid.Ag.Ex.St.,77-8,p. 35
6	Southern White Fodder, Conn. Cut when tassels began to appear. Sown thicker than 5	" " "
7	Southern White Fodder, Conn. Cut 2 weeks later than 5.....	" " "
8	Fodder, Norfolk White, Conn. On long tilled ground, stable manure. Cut Sept. 1, Fresh.	Am.Jour. Sci.&Arts, '77, p. 203
9	Fodder, Norfolk White, Conn. Not long tilled. Cut Sept. 1, Fresh.....	" " "
	Average (9 analyses).....	....
	Maximum.....	....
	Minimum.....	....
	Maize Fodder and Stover (Field cured).	
1	Ohio Dent, 1877, Conn.....	Rep.Ct.Ag. Ex. St., '78, p. 60.
2	Norfolk White, Conn., on land long tilled....	Am.Jour.Sci. & Arts, '77,p. 203
3	Norfolk White, Conn., on land not long tilled.	" " "
4	White Flint Corn, Conn., 1877.....	Rep. Ct. Ag. Ex. St., '79, p. 89
	Average (3 analyses).....	....
	Maximum.....	....
	Minimum.....	....

* The statement with regard to Nos. 5, 6 and 7 differ from those given in *loc. cit.*, corrected by the analyst.

† Medium or large variety. Sweet Corn planted June 1, 1877, in good garden soil. Hills 2½ feet apart in row; rows 3 feet apart.

COARSE FODDER.

Analyst.	No.	Water	Ash.	Albuminoids.	Fibre.....	N. fr. Extract	Fat.	Water-free.				
								Ash-	Albumi-oids..	Fibre....	N. fr. Extract	Fat.
W. O. Atwater	1	12.50*	1.81	2.30	55.96	26.42	1.00	2.07	2.63	68.96	30.19	1.15
"	1	12.50*	8.03	6.89	34.20	35.70	2.68	9.18	7.88	39.08	40.82	3.04
F. H. Storer.	1	10.35	4.94	4.38	46.83	32.08	1.42	5.52	4.91	52.28	35.71	1.58
"	2	10.39	5.16	3.33	44.93	34.49	1.70	5.76	3.72	50.12	38.51	1.90
A. R. Ledoux	1	72.81	2.00	1.85	15.27	7.86	0.21	7.37	6.81	56.27	28.88	0.78
S.W. Johnson	1	92.908	.980	.866	1.903	3.198	.145	13.82	12.22	26.84	45.08	2.04
"	2	88.289	1.269	1.310	3.227	5.736	.169	10.84	11.19	27.45	49.08	1.44
"	3	90.480	1.104	.864	2.694	4.719	.139	11.59	9.08	28.30	49.57	1.46
"	4	80.740	2.334	1.538	5.939	9.207	.244	12.12	7.89	30.78	47.94	1.27
W.O. Atwater	5	85.70*	0.94	1.27	4.60	7.28	0.21	6.55	8.87	32.17	50.91	1.50
"	6	85.70*	1.23	1.20	4.95	6.73	0.18	8.62	8.44	34.66	46.98	1.30
"	7	85.70*	1.00	1.48	4.31	7.37	0.14	6.97	10.38	30.16	51.48	1.01
S.W. Johnson	8	87.18	0.84	0.88	4.38	6.44	0.28	6.57	6.87	34.19	50.23	2.14
"	9	85.04	0.74	0.78	5.16	8.06	0.22	4.95	5.19	34.45	53.95	1.46
.....	....	86.86	1.16	1.13	4.13	6.53	.19	8.83	8.60	31.43	49.69	1.45
.....	....	92.91	2.33	1.54	5.94	9.21	.28					
.....	...	80.74	0.74	.78	1.90	3.20	.14					
S.W. Johnson	1	36.490	2.874	4.623	19.077	35.78	1.155	4.52	7.28	30.04	56.36	1.80
"	2	27.590	4.760	4.97	24.76	36.37	1.55	6.57	6.86	34.19	50.24	2.14
"	3	26.920	3.62	3.79	25.18	39.42	1.07	4.95	5.17	34.46	53.96	1.46
"	4	.....	.....	.....	.....	.....	.....	5.13	7.57	33.06	52.49	1.75
.....	....	30.33	3.75	4.46	23.02	37.19	1.25	4.38	6.40	33.06	53.37	1.79
.....	....	36.49	4.76	4.97	25.18	39.42	1.55					
.....	....	26.92	2.87	3.79	19.08	35.78	1.07					

*Reckoned to this per cent. by the analysist for convenienee.

VII. FRUITS AND

No.	Variety.	Reference.
1	Ruta Bagas, Me	Rep. Me. Ag. Coll., '78, p. 31
2	Yam, Conn., 1877	Rep. Ct. Ag. Ex. St., '78, p. 16
3	Sweet Potato (Convolvulus batatus), Nansemond Improved, Va., 1876	Am. Jour. Sci. & Arts,, '77, p. 197
4	Sweet Potato	Rep. U. S. Dept. Ag., '69, p. 76
5	Squash (Flesh), Marrow Squash, Mass	Bull. Bussey Inst., '77, p. 88
6	Squash (Flesh), Hubbard Squash, Mass	" " "
7	Squash (Flesh), Crooked Necked Squash, Mass	" " "
8	Squash (Rind), Marrow Squash, Mass	" " "
9	Squash (Rind), Hubbard Squash, Mass	" " " 89
10	Squash (Rind) Crooked Necked Squash, Mass.	" " " 90
11	Squash (Seeds and stringy matters), Marrow Squash, Mass	" " " 88
12	Squash (Seeds and stringy matters), Hubbard Squash, Mass	" " " 89
13	Squash (Seeds and stringy matters), Crooked necked Squash, Mass	" " " 90
14	Pumpkin (Flesh), common round Yellow, Mass	" " " 83
15	Pumpkin (Flesh), smaller round Yellow, Mass.	" " " 83
16	Pumpkin (Rind), common round Yellow, Mass	" " " 84
17	Pumpkin (Rind), smaller round Yellow, Mass.	" " " 84
18	Pumpkin (Seeds and stringy parts), common round Yellow, Mass	" " " 84
19	Pumpkin (Seeds and stringy parts), smaller round Yellow, Mass	" " " 84
20	Apples (Stem and seeds not included), R. I. Greening, Conn	Rep. Mid. Ag. Ex. St. '77-8, p. 39
21	Apples (Flesh), Baldwin, '74, Mass	Bull. Bussey Inst., '75, p. 365
22	Apples (Flesh), Roxbury Russett, '74, Mass.	" " "
23	Apples (Skin), Baldwin, '74, Mass	" " "
24	Apples (Skin), Roxbury Russett, '74, Mass.	" " "
25	Apple Pomace, from Baldwin chiefly	" " "

VEGETABLES.

Analyst.	No.	Water	Ash	Albuminoids.	Fibre.....	N. fr. Extract	Fat.	Water-Free.				
								Ash.	Albuminoids....	Fibre...	N. fr. extract...	Fat.
A.M.Farrington..... ..	1	87.08	1.41	1.15	1.16	9.11	.09	10.91	8.90	8.98	70.51	.07
S.W. Johnson	2	71.23	.67	2.06	.75	25.24	.25	2.31	7.11	2.59	87.13	.86
"	3	73.39	1.07	1.28	0.98	23.00	.28	4.02	4.81	3.68	86.44	1.05
T. Antisell...	4	65.96	1.07	.40	2.50	29.72	.30	3·14	1.32	7.35	87.34	.88
F. H. Storer.	5	89.65	0.73	0.96	1.19	7.13	0.34	7.07	9.32	11.52	68.85	3.29
"	6	85.28	0.91	0.69	0.99	11.98	1.15	6.17	4.52	6.75	81.57	0.99
"	7	89.33	0.53	1.11	0.95	8.04	0.04	4.94	10.37	8.87	75.44	0.38
"	8	85.65	1.49	2.81	2.86	6.43	0.76	10.35	19.61	19.93	14.60	5.33
"	9	79.01	1.13	2.75	3.89	12.42	0.80	5.36	13.11	18.53	14.70	3.83
"	10	81.35	1.02	2.94	2.82	11.28	0.59	5.49	15.74	15.14	11.99	3.15
"	11	72.35	1.70	5.75	4.48	7.97	7.75	6.14	20.79	16.22	28.81	28.04
"	12	66.72	1.64	6.07	6.24	11.77	7.56	4.92	18.22	18.74	35.40	22.72
"	13	83.32	0.83	3.99	2.05	6.20	3.61	4.93	23.89	12.20	37.44	21.54
"	14	92.41	0.71	0.87	1.11	4.80	0.10	9.31	11.50	14.64	63.21	1.34
"	15	94.57	0.63	0.95	0.86	3.05	0.14	11.61	13.75	15.88	56.24	2.52
"	16	84.44	1.50	2.90	3.92	6.75	0.49	9.64	18.65	25.18	43.41	3.12
"	17	88.01	1.23	2.63	2.97	4.67	0.49	10.25	21.94	24.75	38.95	4.11
"	18	75.94	1.66	6.32	3.74	5.21	7.13	6.88	26.26	15.64	21.69	29.63
"	19	77 79	1.36	5.68	4.12	4.34	6.71	6.14	25.56	18.53	19.56	30.21
W.O. Atwater	20	85.96	0.28	0.27	....	.....	....	2.00	1.92			
F. H. Sorter.	21	84.11	0.23	0.21	0.91	14.26	?.28	1.45	1.32	5.73	89.74	1.76
"	22	82.22	0.26	0.27	0.95	15.77	.53	1.46	1.52	5.34	88.70	2.98
"	23	71.60	0.45	1.00	5.37	19.31	2.27	1.58	3.52	18.91	68.00	7.99
"	24	69.93	0.53	1.08	5.02	21.73	1.71	1.66	3.59	16.70	72.26	5.69
"	25	77.21	0.50	0 98	3.90	15.71	1.70	2.19	4.30	17.11	68.94	7.46

VII. MISCELLANEOUS.

No.	Variety.	Reference.
1	Broom Corn Seeds, 1875-6. Boston Seed Store. More plump than 19	Bull. Bussey Inst., '77, p. 99
2	Broom Corn Seeds, 1876, Hartford, Conn	" " "
3	Broom Corn Seeds, 1876. Youngest anthers not yet fallen	" " " 100
4	Broom Corn Seeds, 1876. Plants out of flower. Youngest anthers all fallen	" " "
5	Broom Corn Seeds, '76, Sept. 21. Much more mature than 21. Still soft and unripe	" " "
6	Sorghum cane (free from leaves, roots and tops	Trans. N. Y. Ag. Soc., 1861..
7	Seeds of Juncus bulbosus, var., Gerardi or Bothnicus	Bull. Bussey Inst., '75, p. 343
8	Pachyma Cocos.—"tuckahoe"—edible fungus	" " " 370
9	Sapindus marginatus. Soap berry	Rep. Dept. Ag., '70, p. 107....
10	Juniperus communis. Juniper berry	" " "

VII. MISCELLANEOUS.

Analyst.	No.	Water	Ash	Albuminoids.	Fibre.....	N. fr. Extract	Fat.	Water-Free.				
								Ash	Albuminoids....	Fibre....	N. fr. Extract...	Fat.
F. H. Storer..	1	11.20	2.02	6.97	6.67	69.82	3.32	2 27	7.85	7.51	78.63	3.74
"	2	11.93	2·55	7.56	6.57	68.14	3.25	2.89	8.58	7.46	77.39	3.68
"	3	5.67	4.18	6.96	26.66	65.45	1.08	4.43	7.38	28.26	58.78	1.15
"	4	5.97	6.14	9.07	23.90	53.61	1.31	6.53	9.65	25.42	57.01	1.39
"	5	7.19	4.44	9.02	15.15	62.15	2.05	4.78	....	16.32	66.97	2.21
								....	....			
C. A. Goessmann.....	6	78.94	1.24	1.40	8.20	10	.22	5.89	....	8.94	48	.53
F. H. Storer.	7	7.98	2.65	15.89	22.92	47.23	3.33	2.88	....	4.91	51.20	3.62
"	8	14.51	0.24	1.38	9.80	73.73	0.34	....	....	1.45	86.25	.40
T. Antisell ..	9	18.16	3.61	14.44	.....	63.79	....	....	....	.....	77.95	
"	10	14.34	3.86	5.87	.....	75.93	....	....	....	.....	88.65	

SHEEP HUSBANDRY.

By R. W. Gentry, Sedalia, Mo.

Sheep husbandry is fast becoming one of the leading stock industries of our State and nation.

With sheep, as with other domestic animals, our country was exceedingly unfortunate in the fact that the early colonists brought them with them from across the ocean. At that early day no improvements had been made in sheep. It is within the last 200 years that such wonderful improvement has been made in sheep; and it was during this period that most of the present recognized breeds were established.

The *common* sheep of Missouri and of the Union are, for the most part, descended from the importations of the early colonists. These importations were mostly from England, and were what would now be called "scrubs." It is a calamity to this country that these importations were made. As a result of them, we have now in every State in the Union and in the Territories, a breed of Mongrel scrub sheep, hardly worth their keeping, and yet the owners of them are so incredibly stupid as to continue raising them with little or no improvement.

According to the report of the Department of Agriculture at Washington, for the years 1881 and 1882, the total number of sheep in the Union is 45,016,224, valued at $2.37. According to the same report, the number of sheep in Missouri is 1,425,411, valued at $2.00 per head.

But while we have $100,000,000 invested in sheep in the Union, and $3,000,000 in Missouri, the business is in its infancy in both State and nation. We have in Missouri nearly 12,000 square miles more of territory than there are in England; and yet England has 35,000,000 and Missouri less than 1,500,000!

When we consider these figures, we need not fear overstocking our State at least for long years to come.

Another important consideration is Missouri's adaptability to sheep husbandry. I can assert with perfect confidence, that in no part of the

habitable globe, can the various breeds of sheep be more successfully handled than in our State. Missouri has at present a rare opportunity in the sheep traffic. Texas is filling up with sheep with a rapidity unparalleled; and she is calling for cheap ewes in large numbers. She calls specially for ewes which are the offspring of Merino bucks bred onto common Missouri ewes.

The writer could have sold 10,000 such ewes last season, but they cannot be found to supply the demand. Why is it that our Missouri farmers are so dull? A cross of good Merino blood onto the common and mixed sheep our State would increase their value from 25 to 50 per cent; and yet those whom this most concerns, think $10 an extravagant price for a good Merino buck.

The income from sheep is two fold: wool and mutton. The relative importance of these and therefore the breed of sheep most profitable to keep, is a matter of much discussion. But the whole matter can be disposed of in a few words: Where lands are dear and farms small and large markets are near at hand, mutton is, of course, by far the most important consideration; but where lands are cheap and markets are distant, wool is the more important item. An acre will produce more dollars of mutton than wool; but a car will carry more dollars worth of wool than mutton. The wool producing belt follows close on the heels of emigration, and the mutton belt follows after.

Here in Missouri we occupy a middle ground. Both wool and mutton or a combination of the two can be profitably raised.

Sheep are peculiarly profitable over and above most domestic animals. If they cannot be sold for the time being and have to be kept over, they pay for their keeping by their wool; and should one die, his pelt pays for his keeping. Sheep are peculiar also from the fact, that while with good keeping they yield the largest revenue, with poor keeping they yield the least.

The first consideration in successful sheep raising, especially with the heavy fleeced Merinos, is constitution. And what is constitution? The best definition I can give is that it is form plus temperament. A good form consists in a blocky, heavy set body, full and round in the girth, a short neck and head, good heavy legs, set straight and wide apart, and good heavy bones. But a sheep may have all these points and more, and yet bring its owner but small returns. Temperament is an important item; two sheep may be alike in form, and one thrive while the other declines. Temperament means the disposition, motion, etc., of the animal. Some sheep are too nervous; others are too dull. One leads the flock; the other "pokes along" behind. One resists disease; the other yields to the most trivial ailment.

Difference of temperament consists in difference of tone and endurance in the nervous system, muscles and vital organs.

The shepherd should cull his sheep frequently, always ridding himself of those which have done him little or no good.

Another important point is the seize of sheep. While many of our sheep are too small, we do not believe in any insane craving for size. A sheep should be a *sheep*, not a cow or horse in size. Whenever size reaches that point where we get the largest returns for the food consumed, we have gone far enough. The size of our best mutton and our best wool-bearing sheep is large enough. The care of sheep may be considered under two heads: Summer treatment and winter treatment. In summer, sheep should have good blue grass pasture. Clover and timothy pasture is good, but the clover is objectionable in breeding. Pasture for sheep should not be too growthy. Sheep prefer short grass. Years when weeds grow luxuriantly, pastures should, by all means, be mowed. A change of pasture is good for sheep; hence, pastures should not be too large.

Good water is very important, both in summer and winter. Sheep need pure, and if possible, running water. Several much dreaded diseases are bred in stagnant or standing water. Spring or well water is best, but pond water is good, provided it be drawn off in pipes. Salt should be kept by sheep. To secure the largest returns, they should be housed from the rains. During summer their feet should be trimmed; and constant vigilance is necessary to prevent losses from maggots. Coal oil, turpentine and dissolved blue vitrol are used for the maggot; but they cause the wool to peel off, and the vitrol, if strong, is especially severe. Crude carbolic acid is in every way the best agent employed. It is healing instead of burning, and the smell of it keeps away the fly. True it stains the wool; but this is better than losing it. During summmer, sheep's noses should be frequently tarred to keep away the grub fly. Thrusting the tar paddle into their mouths is very helpful. Sulphur is not good for sheep, it opens the pores of the skin and makes them too sensitive to the weather.

Success in sheep husbandry depends largely upon the winter treatment of the flock. Proper winter treatment consists in good warm housing, good feed, fed bountifully and regularly, and pure water daily at hand.

The absolute stupidity of the stock raisers of Missouri is shown more plainly by nothing than in their indifference to shelter for their stock. Thousands put up the pitiful plea of lack of means. This is a miserable pretense. How many farmers are without straw ricks and timber? These things are cheap; and a little work will make of them shelter for sheep, far better than nothing. A sheep man can afford to borrow money to build sheep barns if he can afford to borrow it for any purpose. Such money would not be dead

capital by any means. It means more wool, more mutton, more lambs, larger and better sheep, more manure, less feed, and, strange as it may seem to some, less labor.

First of all, sheep should be fed twice a day all the hay they will eat. This hay should be good; and if cut in season and barned properly, it will be good. I abonfinate musty or over ripe hay for anything, but especially for sheep. In this matter the "thickheadness" of Missourians is again shown.

In addition to all the hay they will eat, sheep should be fed liberally at least once a day, (twice is better) either shelled corn, oats, shipstuff or bran, or a mixture of two or more of these. When corn shellers are so cheap, there is no sense in requiring the sheep to do their own shelling. Corn fodder, a favorite feed with most farmers, is not worth the cutting to those who have plenty of hay.

One of the great needs in Missouri is water for sheep during winter. *Sheep need water daily*; but unless it is near at hand and in convenient shape, they will not drink. The eating of snow is a vice of which sheep should be broken by housing and salting. Water should be near at hand and in troughs. Good water freely drank daily, is worth half the food. Sheep will not drink satisfactorily through ice holes in a pond.

By far the largest per cent. of loss is in wintering lambs. These require careful and constant attention. The common fault in caring for them is in not feeding them till winter comes. Lambs should be put onto feed as soon as weaned; or better, before they are weaned. It is woeful folly to delay. Even if they do not die, they are "stunted" and will never attain the size they would. The time to crowd stock is before maturity. After maturity feed only fattens. Lambs should have the best of everything and be kept in small bunches. In feeding sheep, and specially lambs, sudden changes of feed are to be avoided. They cause the wool to slip, and otherwise derange the system.

Diseases are most fatal to lambs and poor sheep. Many lambs have died this winter from the "Lung Worm." Strange to say, most farmers are ignorant of the nature of this disease. The eggs of this worm are deposited in marshy places and standing water. The sheep, in nipping the grass, swallow them. They hatch and develop in the intestines and bore through and enter the terminal air passages of the lungs. Here they lodge themselves, and unless the sheep is quite strong and vigorous, or unless he is doctored in time, death sooner or later results. Treatment consists, first, in plenty of food and drink; in addition, salt and tar should be kept by them. They should be dosed every other day with a tablespoonful each of turpentine diluted with water. Burning tar in a close room and keeping them there a couple of hours is also a good resort. This disease is what is known as

"Paper Skin." The lambs grow poor, scour, look dull, grow weak in the eyes, lips and skin, and lose their rosy tint; they finally become too weak to stand and die.

Grub in the head is another subject of loss. This may be prevented by liberal tarring of the nose during fly time and by injecting snuff up the nose with a small syringe. This latter sometimes knocks them down, but it is harmless and causes them to expel the grub by sneezing.

Foot rot is another troublesome disease, which, though very prevalent in Ohio and Vermont, is not very common in Missouri. It is caused by foul stables, low, wet pastures, and sometimes by rainy, growthy seasons. It is quite contagious, and while it can be cured, requires a good deal of work.

The remedy consists in using the knife till you cut away the horny hoof *as far as the disease has gone*, and rubbing with a swab dipped in dissovled vitriol. The swab may be made of a stick of hard wood a foot long and the size of a man's thumb. Trim one end to a flat, tapering point and just above the point cut a notch and tie on a piece of wool. Dipping the feet or driving the sheep through any preparation will not suffice. It is best to dissolve the vitriol in vinegar. There's no doubt about curing this disease, but it is objectionable because it requires labor, and because the sheep lose in flesh.

Scab is another much dreaded disease. The various patent dips are all good, some better than others, for its treatment.

Let no one be deterred, through fear of disease, from embarking in sheep husbandry. Begin moderately, learn the nature of the various diseases and how to treat them, and success is assured.

REPORTS OF COUNTY SOCIETIES.

The law requires that "County Agricultural and Mechanical Societies" shall make annual report to the Board of Agriculture. I have received but one such report. The credit of this report is due to A. Fisher, Secretary of the "Union Agricultural and Mechanical Association of Lewis, Knox and Shelby counties," for the year 1881. No report for 1882 has been received. During the year 1883 the secretary will open correspondence with the officers of these societies.

The two following addresses were made at a board meeting held at Providence Hall, Miller township, February 16th and 17th, 1883. Prof. Schweitzer and acting Secretary Sanborn gave two addresses, each without notes. Each one of the last two speakers will prepare their remarks for the next report; and, as the present report is now due from the printer, it is considered better to delay the report of this meeting until the report named is published. It is due to Prof. McAnally to say that his address was given without notes, and that the following is but a synopsis of his remarks:

The Saxon Farmer of a Thousand Years Ago.

By Prof. D. B. McAnally, Prof. of English, University of Missouri.

A few years ago in England, there was reprinted a series of old cuts which first appeared about 500 years before in the same country. The first represented a king, properly robed with his crown and sceptre, and the legend, "I govern all." The second depicted the bishop with his miter and crozier, and the inscription, "I pray for all." Then appeared the soldier, "I fight for all." Then the lawyer, "I plead for all." Then a long, lank, half-starved farmer, drawing a pocket book out of his pocket, with the remark, "I pay for all." The print gave a very fair idea of the condition of the farmer in those days. The farmer was looked on as sort of cow to be milked at convenience and whenever the needs of those above him seemed to require. The farmer was a means by which all other classes could live without working. There are only three means of getting a living, by working, begging and stealing. In those days, a thousand years ago, the farmer did all the work and others lived on the results of his labor. Taxation was consequently extremely high, and these alone were sufficient to account for the misery of the lower ranks of the people. When the crops were grown, the king's share was one-tenth, the share of the church was about a tenth more, and for rent, the landlord took from one-third to one-half. The farmer was therefore left with about three or four-tenths of the results of his labor.

But this regular taxation, though heavy enough, was by no means all that the farmer was forced to endure. On many special occasions during the year the farmer was compelled to contribute of his scanty means to the landlord, to the church, or to the king. When the landlord or any one of his children was married, a present must come from each tenant. At christmas or easter presents must be made in the form of special offerings at the church. When the king came on a visit to the landlord, or when there was a war, or the prospect of a war, a special tax was laid on every landlord,

and he was forced to get these sums out of his tenants. When property changed hands, special taxes must be paid by both seller and buyer, and these sums came out of the farmers pocket. The result is that the farmer was kept busy in trying to raise funds to meet these various obligations, and the propriety of the legend, "I pay for all," and its pertinence to the circumstances of the case a thousand years ago, will be at once understood.

The land was then rented in "hides," and the explanation of a "hide" of land was here given by the lecturer. It was from an old legend found in several countries when a purchaser buys as much land as can be covered by an ox hide, and then cut the hide into strips and thus claimed a large tract of country. A "hide" among the Saxons meant, usually, about a hundred acres, though the expression is extremely vague, and may mean any quantity from sixty to a hundred and fifty acres.

The uncultivated condition of much of the land in England was then commented upon, and the reason found in the great parks and forests which were then, by the nobility, considered to be necessaries of life. The consequences of this limited cultivation were seen in the frequent famines and the small population. The population then was about 2,000,000, and the cultivated land was barely sufficient, in ordinary years, to keep this number from famine; now the cultivated land of England is reckoned to be sufficient to support 16,000,000 of her population.

The land then was very poorly cultivated for two reasons, the first being the lack of security to the laborer in the result, and the second being the imperfect tools. The heavy taxes were virtually a legalized robbery of the farmers, while the imperfect tools prevented the full resuls of a man's labor being realized. The tools then in use were sickles, axes, picks, pruning hooks, forks, flails, spades. The axes were in the shape of a triangle with the handle at one corner; the pruning hooks and forks did not differ materially from those now in use, while the flail was a stick with another fastened to the end, though the latter was often replaced by a bundle of twigs or a number of thongs. The spades resembled a sausage cutter fastened to the end of a pole, and three men were often required to spade up a piece of ground. One cut the sod with a pick, two others with spades turned the block of sod; thus the work was not only very slowly done, but was very poor after it was done. The plows resembled an anchor with one straight fluke, the shaft of the anchor forming the beam of the plow. On the monastery lands, however, there were better plows than these, a cut of one showing a coulter, mold-board and share, with two large wheels at the end of the beam, altogether not a bad plow for a thousand years ago. All plowmen carried beetles for breaking the clods, a good evidence of the cloddiness of the soil. The crops raised were then very small. The statistics available

give an average of about seven bushels to the acre. The other grains raised were rye, oats and barley. The bread of the common people was made mostly from these latter grains. There were few vegetables and no hoes. Hoes, though known in crude form to the ancients, were not used by the Saxons. Food was seasoned with sorrel and kail.

The farmer can scarcely make a living and pay taxes from crops such as those mentioned, and the question naturally arises: How did he live? The answer is found in stock raising. Hogs were kept in large numbers and in a starving condition until fall, and then fattened on the mast, which was abundant in the forests. The forests were valuable not for the wood, because the wood was not available to the tenant; he might not, at the peril of his life, fell a tree or use a stick save what had fallen of itself. Limbs and trees which had been blown down were legitimately the property of the tenant according to the usual terms of his lease; hence, the term "windfall." A hurricane or a great sleet, which broke down trees by wholesale, was, therefore, a god-send to the tenants, since a winter's supply of wood might often thus be laid up in a few days. Forests and trees were valuable, therefore, not for the wood, but for the "mast," and a tree, when sold, was valued according to the number of hogs that could be fattened under its branches. The owner of the forest was usually paid at the rate of one hog in every ten that were fattened in his forest, which was a rather heavy rate, particularly as it was in addition to the other taxes.

The Saxons in addition to hogs had sheep, which were valuable chiefly for wool and milk, and goats, which were esteemed mainly on account of their skins, flesh, and milk. They had also large herds of cattle kept for their milk and flesh. Milking was done twice a day during the winter and three times a day during spring, summer and autumn. The month of May was called "Trimilchi," from the fact that in that month the farmers began to milk their cows, sheep and goats three times a day instead of twice.

A curious illustration of the fact that the Saxons did the raising of the animals, while the Normans did the eating of the flesh, is found in the difference of the names, the name of the animal being Saxon, that of the flesh being Norman-French. Thus we have swine and ox and sheep and chicken, Saxon names and pork and beef and mutton and pullet or fowl, French names. The Saxon animals were poorly cared for, had no protection in winter and several dates are recorded in history when almost all the cattle died during the winter for want of food.

Saxon homes were rather cheerless places. The houses were of earth or stone, their roofs of earth, turf or straw, the floors earth, the fireplace open, a shelf on one side of the room for a bed, a rude table for dinner. Sometimes there was built in the room an oven of large flat stones, cemented

together with mud and this not infrequently in very cold weather served for bed as well as oven. The fuel was feat, turf, wood, straw and sometimes coal.

The Saxon women did no field work, and in this the Saxons had an advantage over the Latin races since their women did not become degraded by rude, outdoor employments. The dress of the women consisted of one long gown, shoes, hose and a square cloth for head. Their husbands wore a tunic, leather, sometimes wooden shoes, hose of woolen, leggins, the head being bare or else covered by a leather cap. They wore no gloves, these being not yet in use in England, though in a crude form they were used on the continent. The cooking utensils of that day consisted usually of one pot, one skillet for frying, an oven like those formerly in use in some of the southern States and a spit for roasting meat. Meat was also roasted by being fastened to a hook, suspended from a string and allowed to revolve before the fire. They had also a gridiron for broiling which seemed to have been a rather favorite utensil.

The table furniture comprised knives, plates so deep as to resemble bowls, and bowls or cups for soup. There were no forks, the fingers of the household and guests serving them in this capacity, but they had spoons. Meat was cut into sizes when boiled, and when roasted was cut from the spit by each one as he had need.

The general condition of the farmers is thus seen to have been one of great misery. The heavy taxation was equivalent to a robbery, and the continual danger in which the people lived, made them as timid as rabbits ready to run at the least sound. Every stranger was considered an enemy until he had proven himself a friend, and as an evidence of this fact, travelers on the highway were forced to shout or blow a horn when approaching a village that the people might not take them for foes who came unawares.

The severest punishments were meted out with ruthless severity for most trivial offences, and killing a hare was often a worse crime than killing a man. The wholesale slaughters of the common people caused them to look upon the nobility as their worst enemies. William, the conqueror, destroyed great numbers of villages in order to clear the ground for his celebrated new forest, and when he made his clearance of the north, a tract across England was so desolated that over 100,000 Saxons died of famine and pestilences induced by want. Thus merry old England was after all, rather a sad place. Long after the days treated of, the lives of common farming people were held in so little esteem that during the reign of Elizabeth there were over 73,000 executions for various offences. It was cheaper to hang a criminal than to detain him in prison, and so men and women were hanged for offences for which now they would receive a month's imprisonment. The difference between the farmer then and the farmer now lies mainly in

the fact that then he was a tenant, now he is his own landlord. In this country at the present day, there are none of the conditions which then existed. The history of every nation in the past has shown that the men who have held the reins of government in their hands have been the men who owned the land. It was natural and right that it should be so, and there is no good reason why in this country the same condition should not exist. The farmers are the land owners here, and if they do not administer the affairs of government the fault is their own.

By Levi Chubbuck, B. S., Superintendent of Missouri Agricultural College Farm.

In the eternity of the past, the great and allwise God created this, our world and set at work those forces which carried it on from its nascent state to such an one in which life could exist. Then God created a set of living things suited to the condition of the world at that time. As this condition improved, the old set, having fulfilled its mission, disappeared and gave place to a new creation of life more highly organized than the first. This in turn gave away to a still higher creation, and so on through the millions of years comprising the geological ages; one creation being succeeded by another and more perfect creation, till the world was fit to be inhabited by something still higher than the most perfect animal. When God viewed His handiwork thus far He saw that it was good and was pleased. And he said: "Let us make man in Our own image; after Our own likeness." "So God created man in His own image. In the image of God created He him; male and female created He them. And the Lord God formed man of the dust of the ground, and breathed in his notrils the breath of life, and man became a living soul." Thus was man the glory and crown of God's work—a being not only most highly organized physically, but also endowed with an intellect, by virtue of which he was given "dominion over the fish of the sea, the fowl of the air, and over every thing that moveth upon the face of the earth;" and, besides this, he had within him a soul, an immortal spirit, that was to live through all eternity.

This first pair, coming, as they did, directly from the hands of their Creator, without being touched by the deforming and degrading power of sin, must have been perfect pieces of workmanship, having all their faculties

fully developed. God planted a garden Eastward in Eden, and there were Adam and Eve placed, Adam's instructions and duties from God being to dress and keep the garden. Thus did man begin his career by caring for and dressing a garden, planted by the hand of God, He deeming that a fit occupation for the most perfect being that had come from His hand. And well was it suited to man's innocent state. But, Alas! sin entered the world and man fell, and was driven from that happy home to make one for himself, and to eat his bread by the sweat of his brow, the ground having been cursed for his sake. Ever since that sad day man has been wandering up and down the face of the earth, searching for his lost paradise; some place where he would be free from the sorrows and anguish, the trials and woe of the world. And what is the most natural way for him to turn but in the direction in which he knows this lost earthly paradise lies? And what occupation should he engage in, if he wishes to be happy, but the one which he knows was that of his first parents, before they knew anything but happiness? Agriculture, then, was the earliest employment of man, instituted by God, Himself; and we have His promise that it will be among the most enduring of the world, for He says that, while the earth remaineth, seed time and harvest, and cold and heat, and summer and winter, and day and night, shall not cease. It could not be otherwise, under the natural laws of the world, than that this should be the first and last occupation of man, for it is the most essential calling in the world, and the only one absolutely so.

It is agriculture that supplies man with food and clothing, those things which must be supplied or life departs, and with which life could be sustained if all the other arts and sciences of the world were swept away, even though life under such conditions would be that of a brute. It is this pursuit on which all others depend, and without which there could be no manufactures, no commerce, no fine arts, no life. These are as dependent on agriculture as is agriculture on the light of the sun. Says one: "It is agriculture that is the mother and tender and faithful nurse of all the other arts and sciences." How important, then is this calling! Says Prof. Johnson: "That art on which a thousand millions of men are dependent for their very sustenance—in the prosecution of which nine-tenths of the fixed capital of all civilized nations is embarked, must confessedly be the most important of all, the parent and precursor of all the other arts." It is claimed for agriculture that it is the parent of civilization. Thus the farmer finds his calling to be the oldest, the most important, and the first civilizing pursuit of man; venerable in age, essential in character, and grandest in results. What calling is worthy of so high a degree of pride? As is said by a distinguished writer: "In every country and at every period, the investigations of the principles on which the rational practice of the art is founded, ought to have commanded the principle attention of the greatest minds."

Thus realizing something of the importance of agriculture, how much the civilization of the world is dependent on its development and elevation, every one who loves his country and desires the advancement of the human race, is called upon to aid in elevating the class engaged in this pursuit.

On comparing the condition of the agricultural class in our own country with that of other classes, we see many things that are not as they should be.

This class does not occupy the position that it ought to, politically, financially, socially or intellectually.

Even though a large part of the population is that of the country, and more than fifty per cent. of the taxable wealth is agricultural property, though it is this population and this wealth that largely sustains the other classes, what is the condition of this class, compared with that of the lawyer, doctor, merchant or minister? In fact there is hardly any class above that of common laborers, but is better off than a large proportion of the farmers, when really their condition should be the most enviable in the world. I said that all other classes are largely dependent on country people and property. Perhaps this statement is thought to be without foundation. Let us see. To say nothing of the fact that all classes, non-producers and producers, are dependent on the farmer for their daily bread, consider for a moment the vast numbers who are directly engaged in buying and selling, transporting and manufacturing country products, and those directly dependent on them. But, it is said, do not these add to the value of farm products by carrying them cheaply and quickly to market, and by working them up into more available forms? And are they not entitled to pay for their work? Most certainly they add value to these products, and are to be compensated for it; but the question is, who is entitled to the most pay, and who gets the most? Let us examine somewhat the profits of the railroads—those that get the first and perhaps the largest bite out of the profits. That the railroads are largely dependent on the carrying trade of farmers, is evident on a moment's thought, and on noticing the loaded trains that go East to the sea board and the empty ones that come back to the West. This carrying trade of the farmers furnishes by far the largest part of the earnings of western roads, at least. Which of these two classes, farmers and railroaders, is the better paid?

There is not a single class in the employ of railroads, above the section hands, but is better paid for the amount of work done than is many a farmer who owns a "quarter section of land as fine as the sun ever shown upon."

Now, by what merit are the railroaders entitled to better pay than farmers? It is not because a higher degree of intelligence is required in a railroad man than in a farmer, as I will attempt to show. Is it because of the vast amount of capital invested in railroads? But the great mass of railroad employes are not stockholders, and those that have invested their

money in railroad stock do not assist much in carrying on the work. But what is the money invested in railroad property, compared with that invested in agricultural property? And the investors in this latter are those who work it. Besides, when the large amount of capital invested in railroads is referred to, just think for a moment of the millions given directly and voted, in taxes by these same farmers to the railroads; also the States' credit loaned, and land grants made by the general government to them. Now, when I compare the pay of these two classes, I do not mean to say that railroad men generally are too highly paid or too lightly worked; but that the income of the two classes is not properly adjusted, is evident, when the salary of the Commissioner of Agriculture at Washington, who ought to be a cabinet officer, but is not, is compared with that of a railroad president.

The condition of farmers compared with other classes is different now from what it was in the days of Washington and Jefferson. Then they were the leading ones, and took an active part in the affairs of the country. What has been the cause of the change of rank from being one of the highest to one so lowly? Whose is the fault? The fault is the farmer's own, and the causes are lack of intellectual culture, progress, and organization. While farmers have made considerable progress in the last century, other classes have made giant strides in their onward march and have overtaken and passed their more lagging comrads, and have won from them honor, power rank and intellectual superiority. All other classes have organized their forces and thus have been able to defend and advance their interests and have overreached the farmer at every turn, notwithstanding the fact that farmers so largely out number any other class.

Efforts have been and are making, seeking a general organization of farmers; but as yet this has not been accomplished, and I think it well that it has not been. There is need of something else before this. Under a general and complete organization the farmers of this country would be supreme, and could not only control affairs in this country, but could bring a powerful influence to bear on the affairs of the world.

Would it be safe to put such a power in the hands of any class that had not sufficient intellectual and moral culture, to prevent their abusing it?

Then the first thing to do, in seeking the advancement of farmers, is to give them greater intellectual culture. That farmers have neglected the culture of their minds is largely because, long ago, the idea became current that to be a successful farmer all that was needed was great physical strength and a willingness to work. Certainly, in earlier times, the strong man had a greater advantage over the weak one than now, and the weak men, physically, seeing their disadvantage, turned from pursuits calling for physical strength to those which developed their mental strength; and, as the latter is always superior to the former, men possessing the mental strength took control of the affairs

of the world. With the idea that mental culture was not necessary to the farmer, the equally pernicious idea entered the minds of men that physical culture was necessary to a man engaged in intellectual pursuits. Noting the superior power, rank and influence of other classes, and knowing that it is mind that has won them, country fathers and mothers, teachers and friends, whenever they have noticed any evidence of unusual mental strength in their children, pupils or young friends, and have wished to do them good, have endeavored to instill into their young minds that are ambitious to become great and powerful, that to become so, they must leave the farm and become lawyers, doctors, ministers, teachers or merchants; that the paths that lead to the surest and greatest glory are those that lead most directly to the President's chair; and that this is placed on the very summit of human glory; and that each and every American boy has an equal chance at the prize; and the ambition and effort required to gain it is most laudable. How often do country parents, when they think they can't educate their boys, try to induce them to learn a *trade*, deeming that the boys would be better off thereby, not recognizing that their own calling, when properly appreciated, is one of the grandest on earth, not thinking it worthy even to be called a trade.

Speakers, when addressing school boys, are often heard to say that it is better to be a good farmer or mechanic than a poor lawyer. This I endorse most fully, but not in the spirit uttered, and not with the insinuation implied, that a fair lawyer is better than a good farmer or mechanic. The man who, when viewing the great Corliss engine, which, at the Centennial Exposition, furnished the power for the vast amount of machinery collected there, said that he would rather be the maker of that engine than to be President of the United States, struck the right chord, and not only recognized in the mind capable of such work a most powerful one, but one capable of doing the world more material good than any President can do.

Such mechanics as George Stevenson, Robert Fulton and those who have given to the world the cotton gin, the weaving loom, the reapers and plows, are not to be ranked below the average lawyer. And the men that give to a starving people the potato; that improve a breed of sheep so they will produce a pound of wool more to a fleece; that produce the peach from the bitter almond, the grape from the wild grape of the woods, and that make two blades of grass grow where one grew before, bestow on mankind greater blessings than have all the Presidents from Washington down, while acting as such.

The value of some of the products given to the world by the farmer may be comprehended to some extent when it is stated that should the potato be lost so that there would be no possibility of its reproduction, the loss would

be greater than if the entire city of New York should be swept out of existence. That the farmer should be a man of strong mind and very varied knowledge is evident to all who will consider for a moment what his work is. Something more is needed than to be able to sign his name, to read a little and to calculate the value of a load of wheat. Who, then, requires a more thorough knowledge of zoology? It is not enough that he simply knows that certain plants grow better on one formation than on another, but going back to the time when the face of the world was a shoreless waste and the waters of the deep held sway, then noting the first emergence of dry land and the receding of the waters, he should be able to trace the progress of the battle between sea and land for supremacy; how the land slowly grew, though at times by subsidences the sea rushed in and wore away the rocks; made new deposits, and then by upheavals the sea was driven back; how this was continued through vast cycles of time, by which the rocks were upheaved, then broken and worn down and deposited anew, until that fertile soil was prepared which had "but to be tickled to laugh back in waving harvests." Did the farmer but know of the vast periods of time and mighty forces employed by God to prepare this soil for him, could he employ those methods that are so commonly used by which this fertility is so soon exhausted? Would he not rather make further use of that intellect which God has given him and maintain and increase its fertility?

This is but one of the many sciences with which the farmer's work is closely connected.

His work being to produce organic from inorganic matter, how important it is that he should be intimately acquainted with the mineral world? That he should understand the chemical laws by which this material is prepared for plant food; that he should know the physical laws by which food is conveyed to the plant, taken up by the leaves and roots and conveyed to different parts of the plant, and the physiological laws by which this food is assimilated and woven into the tissue of the plant, making a leaf here, or wood there, or a beautiful flower and afterwards the fruit.

Then the study of botany that reveals to man the nature and habits of plants. Entomology that opens to view the mysteries of the insect world, numbers of which have associated themselves so closely with the farmer's work, much to his sorrow, and against which mere physical force is of little avail. The science of meteorology too, that is being so rapidly developed; how important is this to the farmer who is so dependent on the weather?

Thus can the farmer call on all the natural sciences for aid, and if he is able to use them they will be his faithful servants and greatly aid him is his work.

But is this all that a farmer needs, knowledge that will enable him to raise more corn and potatoes, wheat and cotton? That the farmer should be more thoroughly educated than he has been so far is conceeded by all. Educators recommend that he be taught geology, mineralogy, botany, vegetable physiology, chemistry, and other sciences that have a direct bearing on farming, besides the usual course in reading, writing, grammar, spelling, arithmetic and geography, for these will enable him to ply his vocation with more success.

But is this all? Is he only to study that which will enable him to raise larger crops of wheat and corn, fatter cattle and swifter horses? Is he only to be educated so that he will be a more faithful and profitable servant than now? Had God designed that this be the extent of the farmer's education, He would not have endowed him with the same intellectual powers as other men. He would have created a set of beings without these higher faculties. But, having given all men these faculties; he meant that they should be used, for God does not create anything but for a purpose. Having then equal mental endowments with all men, it is the farmer's right and duty to cultivate his mind with all men. It is his duty, as a citizen, for comprising, as he does, the most important element in the county, it is most important that he should be qualified to take his proper place in public life. It is his duty as the head of families, for around his fireside are gathered young minds that are receiving impressions and tendencies which will shape their whole lives. The domestic fireside is a seminary of infinite importance. The education there received and the impressions made, are the most lasting of the world. The thoughts and recollections of childhood are so chiseled upon the heart as to defy the rust of years, and remain in the memory fresh and green, even when age has made all between that happy time and now a forgotten waste.

If the country fathers and mothers were all well and liberally educated, that they might guide their young minds aright, how happy would be the result. It is his duty as a man. He was created with a mind that rises above the level of the brute. This must be cultivated. Unless the body be exercised properly it will become weaker; so also of any of its members. The same is true of the mind; it must be cultivated, or its strength is impaired.

If any of its faculties are neglected, they grow dull. Therefore, any study which will assist in the development of the mind is as right for the farmer as for any other man. But it is said that the farmer does not have time to do so much studying. He lives as long as most men; I believe a little longer than most men. Why then does he not have as much time as other men for mental culture? Because he has to work so hard and incess-

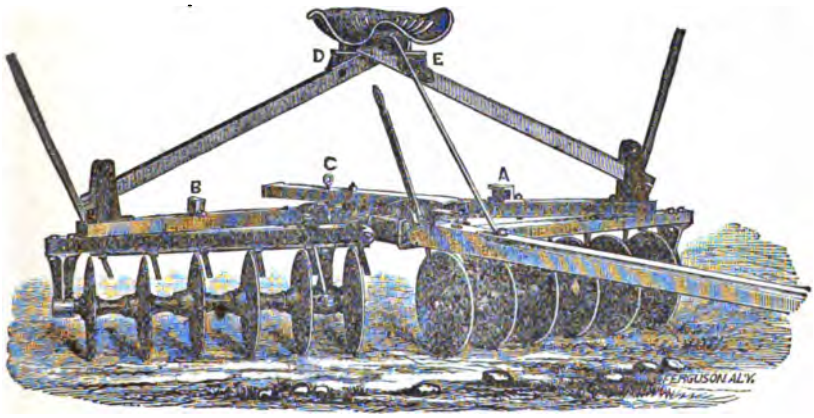
antly that all his energies are exhausted and he has no time nor taste for mental work. This is a good reason. The farmer must be the slave of the rest of mankind, earn their bread for them and allow them leisure for the culture and exercise of their manly powers. The farmer must only be educated enough that he can the more certainly earn the bread and provide the leisure of others. This will never do; but until the farmer realizes his condition and stands for his rights, selfish man will deprive him of them, and he will remain in as low a condition as is compatible with the safety of others.

Mental workers demand and must have a respit from physical toil. When the true devision of labor is made it will not be that some men will do all of one kind of manual labor, others all of another kind, some one kind of mental work, others another kind, but that all men will do some of both mental and manual labor. This will be for the advantage of all. The body must be exercised or the health is impaired, and a sound mind will not be found in an unsound body. So also the mind must be active and cultivated or the powers of the body will not be effectively directed.

NOTE BY THE ASSISTANT SECRETARY.

The implements represented in the following cuts were presented to the Agricultural College Farm for trial and report upon their merits.

The machines or articles in question have not, as yet, been tried at the farm designated, but have been at other points, excepting the creamer, very carefully by the writer.

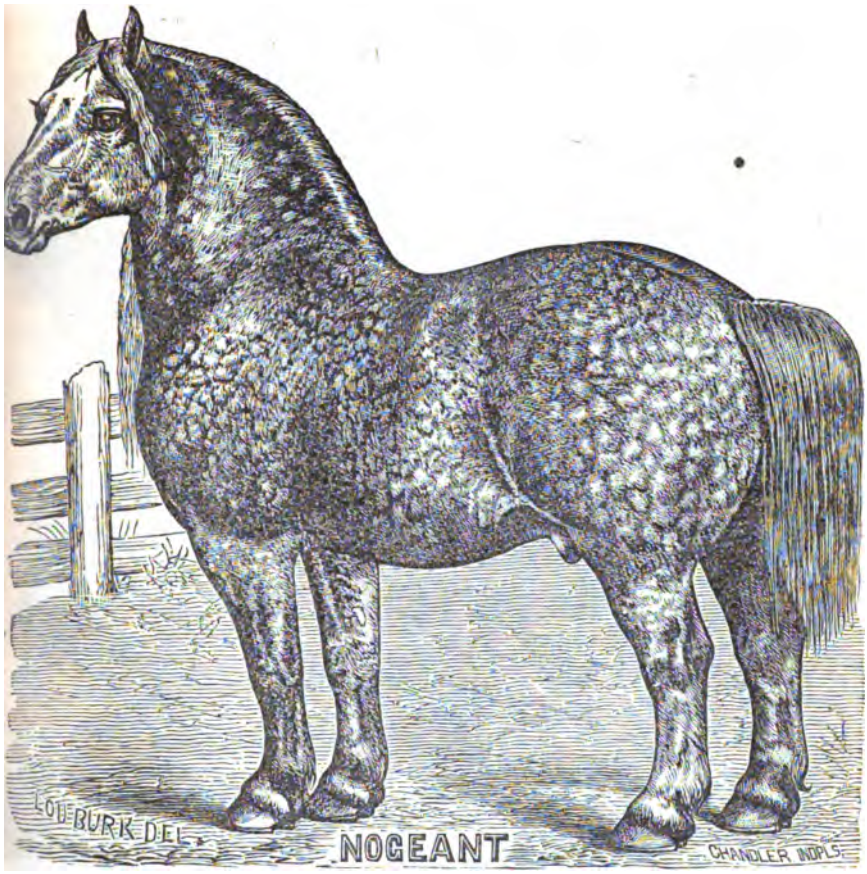


My experience has been favorable with this harrow, especially upon turf or sod land. Its concave plates run at an angle to the line of draft, elevating and loosening the soil without inverting the sod. It stirs the soil and lightens it very effectively. That it does this without inverting the sod is regarded as a very desirable feature. Ex-Secretary McAfee and others have tried the harrow here and commend it. Sold by Bauer & Walter, St. Louis, Mo.

This churn is without any inside fixtures, the butter being brought by the concussion of the oscilating cream as it moves from end to end of the churn. The churn operates easily, gives all the butter obtained by churns in fine granular form in the best condition for washing, and having no gearing, of course, does not grind any portion of it or streak it with black grease, and is easily washed.

This particular form of cold setting of milk I have not tested, but have devoted a considerable attention to deep can setting of milk by both cold air and cold water. That the deep setting of milk in cold water is successful is no longer a doubt. An inspection of the cut will show the arrangement to draw off the milk from beneath the cream, and afterwards the cream. The cans have ventilating covers for the escape of any odors that may rise from the cooling milk. This creamer will be carefully tested by the side of other systems of setting of milk during the coming year in the interest of the butter makers of the State.

The above creamer and the churn are made by the Vermont Farm Machine Co., of Bellows Falls, Vt.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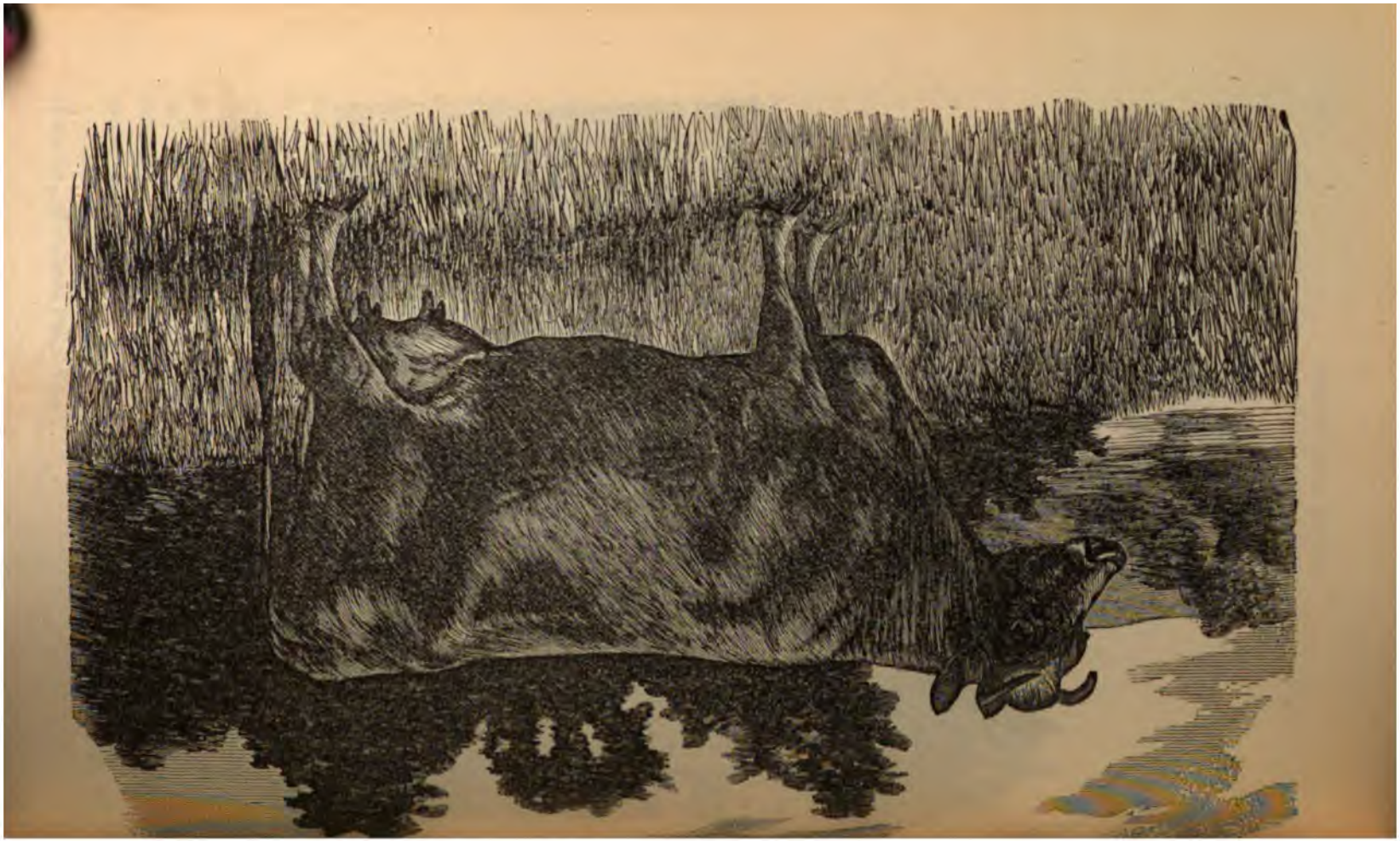

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